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The Home Vegetable Garden and its Pests

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RALEIGH, N. C.

The Home Vegetable Garden.

BY W. F. MASSEY, HORTICULTURIST.

Pests of Vegetable Crops and their Treatment.

BY GERALD McCARTHY, BOTANIST AND ENTOMOLOGIST.

CONTENTS.

THE HOME VEGETABLE GARDEN.

	PAGE.
Introductory	281
Location and soil for a garden,	282
Laying out and enclosing the garden	282
Rotation of crops	284
Cold frames and uses	284
Hot-beds	285
Manures and fertilizers	286
Preparation of the soil	286
Saving seed	287
Quantity of seed for planting,	287
Crops for the garden	288
Asparagus	288
Artichoke	289
Beans	289
Snaps	290
Lima	290
Varieties	291
Beets	292
Broccoli	293
Brussels sprouts	293
Cauliflower	294
Cabbage (early)	295
Late	296
Carrot	297
Celery	297
Collards	301
Corn (sweet)	302
Cucumber (early)	303
Late	304
Egg plants	304
Herbs	305
Horseradish	305
Kale (borecole)	305
Kohlrabi	306
Leeks	306
Lettuce	307
Melons (musk)	307
Water	308
Mushrooms	308
Okra, or gumbo	309
Onions	309
Parsley	311
Parsnip	311
Peas	312
Peppers	313
Potatoes (Irish)	313
Late potatoes for table use	315
Second crop for seed	316
Keeping Irish potatoes	317
Sweet	317

HOME VEGETABLE GARDEN—*Cont'd.*

	PAGE.
Crops for the garden	319
Keeping sweet potatoes	319
Radishes	320
Rhubarb, or pie plant	321
Salsify, or oyster plant	321
Spinach	322
Squashes	322
Tomatoes	323
Turnips	325
PESTS OF VEGETABLE CROPS AND THEIR TREATMENT.	
Introductory	326
Apparatus for applying the remedies	326
Formulas	328
Plants and their parasites	330
Asparagus	330
Beans	330
Beets	331
Cabbage	331
Carrots	331
Cauliflower	331
Celery	331
Collard	331
Corn (sweet)	332
Cucumber	332
Egg plant	332
Herbs	333
Horseradish	333
Kale	333
Kohlrabi	333
Leek	333
Lettuce	333
Melons	333
Mushrooms	333
Okra	333
Onion	334
Parsley	334
Parsnips	334
Pea	334
Pepper	334
Potatoes (Irish)	335
Sweet	335
Radish	335
Rhubarb	335
Salsify	336
Spinach	336
Squash	336
Tomato	336
Turnip	336

THE HOME VEGETABLE GARDEN.

BY W. F. MASSEY, HORTICULTURIST.

Introductory.

One needs but to look around the village and town gardens in the South to become convinced of the great need that exists for information in regard to the proper care of the garden, and particularly that part which is intended to give supplies to the table. Our town gardeners are very active in the early spring, and their enthusiasm often leads them to go ahead and plant a great many things at a season too early for their safety, so that a return of cold often compels the almost entire replanting of the garden. But with the production of the early crops in the garden, the enthusiasm of the gardeners oozes out under the influence of the summer's heat, and the garden that at first looked so neat in its spring dress becomes merely a weed patch. Few of our people realize the advantage that our long summers and sunny autumns give us for the production of a constant succession of crops in the garden, and still fewer realize that in this climate the garden need at no season of the year be abandoned to the weeds. One of the greatest troubles that results from the common practice of allowing the garden to grow up in weeds after the first peas, corn, cabbage, and tomatoes are secured, is that these weeds are the places where the larvæ of the cut-worm hide, and are ready to begin their destructive work as soon as the garden plants are set in the spring. If the garden is kept clean and cropped continuously all the year round, as it may and should be here, there will be no cut-worms to bother the early plants. In the last cold and wet spring, when all of my neighbors were complaining of the ravages of the cut-worms, I had no trouble with them in my home garden, because there was no place of shelter for the insect to lay its eggs the previous summer. From January to January there is no need in this climate for there being any space in the garden unoccupied by crops. From the time when the earliest peas go into the ground in January up to the time when it is necessary to prepare for them the following year we can have a constant succession of fresh vegetables from the garden, by the exercise of a little forethought. And this succession can be made still more perfect if we add a frame with some hot-bed sashes for the production of lettuce, cauliflower, radishes, carrots, etc., during the colder months; while all through the winter we can have celery,

kale, spinach and turnips. It is with the hope that we may be able to help our people out in thus providing a constant supply of wholesome, fresh vegetables at all seasons for home use, that this bulletin has been prepared.

Location and Soil for a Garden.

People living in towns seldom have much choice in the matter of soil or location of the land for the garden, and are generally obliged to make the best of what they have, but on the farm there is usually some range for choice. A deep, mellow, and well-drained soil is of the first importance. If perfectly level, so much the better; or if it slopes in any direction, let it if possible slope to South or East. The surface should incline rather to sand than clay, but deep breaking and heavy manuring will alter the character of even a heavy clay, and for some late crops such a soil is desirable. A clay desired to be improved, could be bettered by a thorough under-drainage with tile, and could be further helped by hauling into it sand and leaf-mold from the forest.

Laying Out and Enclosing the Garden.

A vegetable garden, we will remark in the first place, should be devoted to vegetables alone. You cannot have the best vegetable garden if you attempt to grow fruit trees and vines in it. Such an arrangement is not the best either for the fruits or the vegetables, and where there is plenty of room the two should never be mixed. The farm garden should be of such extent that the work can be mainly done by horse power, and to do this the space should be ample and the garden of such a shape that the rows may be long. In small town gardens, however, the work should be done mainly by human labor, and the grounds can be made more neat and orderly. But even in this case it is not advisable to waste too much ground in walks. These should be simply sufficient for the convenience in working the garden. At the same time, a neat arrangement of permanent walks, well made and kept in perfect order at all times, adds much to the appearance of the garden. A good, tight and high board fence, kept well whitewashed, is the best enclosure for all sides of the garden. This not only gives shelter from the cold North and West winds, but in the shade of such a fence on the South and East sides, will be found a favorable place for many things that do not like the full exposure to our southern sun. If the fence is covered with wire netting it will be found a good place for the training of many things, and thus economize space.

The best shape for the garden is a parallelogram about twice as long as wide. In gardens of moderate size one central walk will be found sufficient, with a narrower one encircling the whole plat, so as to leave a border at least seven feet wide next the fence all around, which will be found an excellent place for seed beds, giving different exposures to suit the wants of various plants.

On the border inside the North fence, is the place for the frames and hotbeds, for I assume that no garden is worthy of the name which is not supplied with a moderate amount of glass sashes, for the forwarding of early plants and for growing to some extent during the winter.

Laid out as suggested, there will be two general plats or squares for cropping, and on these there should be a regular system of rotation of crops adopted, so that at no time need there be any unoccupied land. As soon as a crop has passed its usefulness, clear it out and at once prepare the space for a succession crop of some kind, according to the season.

In a small garden in town, it will always pay to prepare the soil in the best possible manner. While in large areas the plow is undoubtedly the best tool that can be used in the breaking of the land, it cannot be used effectively in a narrow space, and in such grounds its use is attended with an utter destruction of the neatness and keep of the garden. For such small grounds, the English custom of trenching (described below) is the most effective, and the spade and digging fork the best tools. Still, if the upper soil is mellow and sandy and the immediate subsoil is a tenacious clay, it will not be advisable to deepen the soil by turning it upside down and bringing that clay to the surface. In this case it is best to trench the garden by beginning on one side of the square and cut a trench the full depth of the mellow soil, and remove the earth to the opposite side of the square. Then dig the clay to the full depth of the spade, and mix some manure with it, letting it remain in the bottom of the trench. Then open another similar trench alongside the first one, and fill the first trench with the top soil. Treat the bottom of this trench as the first one was treated, and thus go over till the whole square has been dug in this way, filling the last trench with the soil taken from the first one. This subsoiling will need to be repeated once in four or five years and will be found of great benefit to the deep rooting vegetables and in rendering the land more retentive of moisture in time of drought. On a large scale this can be more economically and rapidly done with a subsoil-plow following in the furrow behind the breaking-plow. A deeply-pulverized soil is of the first importance in the cultivation of garden vegetables, and it will pay well to do it thoroughly in the beginning.

While stable manure should always be the main stand-by in garden work, it will be found that a change to the artificial fertilizers as the garden becomes filled with vegetable matter, will be an advantage, and an occasional dressing of lime at the rate of 2,000 pounds of freshly slaked lime per acre will be of great help once in five or six years. This should be always applied in the fall, so that its action on the soil may be apparent in the following spring. On a heavy clay soil some garden crops, such as snap-beans, are greatly helped by a dressing of land plaster during their growth. All the refuse from the garden should be thrown into a compost heap, upon

which the soapsuds from the house and the slop water can be thrown, and turned over at times so as to become sufficiently well rotted for manure, so that eggs of insects and germs of fungous diseases may be certainly destroyed.

Rotation of Crops.

It is hard to say what exact rotation should be followed. Each one must to some extent use his own judgment as to the best crop to succeed one that has just been taken off the land. But it is a good rule to make the succeeding one a crop different from that which has just been grown. Early peas, for instance, should not be followed by another leguminous crop like snaps, but should be succeeded by sweet corn, salsify or other crop for which there is time. Early beets can be followed by snaps, early onions by bush lima beans, and succession crops of sweet corn and snaps can be planted as long as there is a chance for their making a crop for the table. While I am writing this—the first of October—we are eating our last sweet corn, and have the last crop of snaps just coming in. The second planting of bush lima beans is now in use, and will be till frost stops them. Tomato plants set in July are now full of fruit, and we expect to have a lot well-grown when frost comes, in order to take in and ripen in the house till the middle of January. A little thought and experimenting will soon enable any one to keep the garden at work all the year, in some way. On the land where our late crop of corn, snaps and bush beans are now, we will soon plant our onion sets for the spring green onion crop. Spinach sown in August on land that gave us early corn, is now well advanced, and the lettuce plants from seed sown the first of September are now being set in the frames to be protected by the glass when the nights get cold, and we expect to have the lettuce well headed by the Christmas holidays. Then as fast as it is cut we will replace it with plants growing outside in a sheltered bed, and have lettuce on the table till the frames are wanted in March for hardening off our early tomato plants. In the same frame we will sow radish seed the last of October, and later on in January will sow more, so that we can have them all winter through. Thus by the aid of a little glass we have vegetables from a very small garden every day in the year.

Cold Frames and Uses.

A cold frame is simply a box, without a bottom, set upon a rich bed of soil, to accommodate glass sashes. The usual size of the sashes used is three feet wide and six feet long. The sashes are made without any cross bars, and the glass is placed in and lapped like the shingles of a roof. The frame is made about fourteen inches high on one side and twelve inches on the other, to give a slope to the sun and to carry off the water. The high side is placed

towards the North and the low side to the South. Cross pieces are let into the sides of the frame at intervals of three feet, on the middle of which inch strips are fastened so as to form slides on which the sash can be moved to ventilate the frame. The frame is of such a width as will accommodate the sashes the six foot way, and can be as long as desired, owing to the number of sashes in use.

There is no fixture in a southern garden so useful as the cold frame with its glass sashes. With it we can grow many things that are grown in fire-heated greenhouses at the North. They are used for growing lettuce during the winter months, heading cauliflower in the late winter and early spring, blooming violets, pansies, hyacinths and other bulbs during winter; for sowing seeds of radishes during winter, and for sowing seeds of cabbage, tomato, egg plant, etc., in the late winter; for setting later in the open ground, and also, finally, for hardening off the tender plants that have been started early either in the greenhouse or hot-bed. The particular manner of using the frames will be treated of when discussing the various crops grown in them.

Hot-Beds.

A hot-bed is simply a frame under which an excavation is made to hold a mass of fermenting manure to give a bottom heat and to forward plants sown or planted in them. Wherever the garden operations are on a sufficiently large scale it is always better to have a little greenhouse, heated by a furnace or hot-water apparatus for the purpose of starting plants, than to be bothered with the hot-bed. But where there is no greenhouse, the hot-bed becomes a necessity to a well-regulated garden. The excavation for the manure should be at least six inches wider in every way than the frame that is to hold the glass sashes above it, and should be about two feet deep. A frame with two sashes will be large enough for a hot-bed for almost any private garden. For such a bed, the excavation should be seven feet wide and seven feet long, by two feet deep. The manure, which must be fresh horse manure, should be gotten together a week or more before the time to start the bed, and should be piled in a heap so as to heat. A large admixture of oak leaves will make the bed retain its heat longer. As soon as the pile is hot and steaming, turn it all over, throwing the outside to the inside, and let it heat again. When again well heated, place it in the excavation, scattering it evenly and tramping it uniformly as it is put in. Pack the pit six inches above the surface with the hot manure, and then set the frame on and pack more manure all around it, and bank earth over it. Inside the frame place about three or four inches of fine, mellow soil over the manure in which to sow the seeds. Now put a thermometer in this soil and put on the sashes. The bed will get very hot. Watch the thermometer, and as soon as the heat begins to decline (and not till then) you can sow your seeds of tomato and other things that you wish to start

early. The hot-bed needs close attention, for if you leave it shut up closely when the sun shines you will have the whole bed cooked. The thin layer of soil, too, will need frequent watering. The seed can be sown quite thickly in the hot-bed, for it is not intended that they shall remain in this bed till planting time, but that they shall be transplanted into the cold frame to be hardened off. Two sashes on a hot-bed will start sufficient plants for fifty frames in tomatoes, so it will be plain that for an ordinary garden quite a variety of plants can be started in a small hot-bed. Do not waste time with the so-called plant-cloth for a hot bed or a cold frame. If you once get to using the glass sashes you will never wish to bother with the poor substitutes. These sashes can be had from almost any sash factory, either glazed or unglazed, at such low figures that no one who takes any pride in a good garden can afford to be without them.

Manures and Fertilizers.

In a garden that is kept cropped continually, it is important to use manure that has with it large supplies of organic matter. Therefore the manure of the horse stable should be the principal form of fertilizer. In old gardens, however, there at times will grow up an acid condition of the soil from long manuring with stable manure, and then a coat of lime will be found of the greatest benefit. It is also well for many crops, particularly onions and other crops that need large supplies of phosphoric acid and potash, to add to the manure, fertilizers to supply the deficiency of these. The phosphoric acid can be gotten most cheaply in the shape of acid phosphate or dissolved phosphate rock, and the best form to use potash for most garden crops is in the shape of muriate of potash. Do not leave any bare ground in the garden in winter. If there are no crops growing on any part of it, then cover that part with coarse manure, to protect the soil from the leaching effects of rain-falls.

Preparation of the Soil.

Do not be in too great a hurry in the spring to get at work in the open ground. If the soil is at all inclined to clay much damage may be done by working it while wet, as it will harden into lumps that will make the cultivation difficult all during the summer, and materially injure its productiveness. Do not touch the soil until it will readily crumble. Where the garden is of any size it will always be found best to break it with a good plow and pair of horses or mules; and if a subsoil plow can be run in the bottom of the furrows, all the better, for a deep soil is of the utmost importance in vegetable culture. But as we have said before, in a garden where neatness is an object and the size is not too large, it is best to break by hand and deepen the soil by trenching it fully fifteen inches deep. The soil should then be put in as mellow a condition as possible.

Saving Seeds.

In these days when good seeds can be had so cheaply, it is seldom advisable for the private gardener to attempt to save any. There are, of course, some exceptions to this, for with such vegetables as the tomato and sweet corn we can save to advantage and improve by selection. But many seeds are not grown to advantage in our climate, and such are always better bought from those who make a business of growing them. It seldom pays a private gardener to save seeds that require the land to be kept from a succession crop; and with most seeds saved in home gardens, it is usually only the refuse that is saved after the better part has been consumed. Our large seedsmen compete so earnestly with each other in furnishing the best attainable seeds that it is usually better to buy of them. But do not buy any seeds left for sale on commission at the country stores, for they are generally poor, and may be old and dead. The leading seedsmen will send seed by mail so cheaply that there is no need for dependence upon the trash that is put out on commission. In most of our large towns, the druggists sell the seeds from a number of the leading houses, and these can usually be relied upon. But in the case of sweet corn there is seldom any success with the corn usually sold. Not that it is not good seed, but it is grown too far north to suit our climate; and if you want good garden corn, then grow the seed at home, and you will find that, if you select it carefully, you will soon have a variety that will do well, and will not have to rely upon the field corn for table use. Select the earliest and best shaped tomatoes and you will soon develop a variety that will do better for you than any you can buy.

Quantity of Seed for Planting.

The table below is taken from the seed catalogue of George Tait & Sons, Norfolk, Va., and gives sufficient information of the quantity of seed necessary to sow any given space. It is considered perfectly reliable:

FOR A GIVEN LENGTH OF DRILL.

Asparagus.....	for 60 feet, 1 ounce	Parsley.....	for 150 feet, 1 ounce
Beets.....	for 60 feet, 1 "	Parsnips.....	for 180 feet, 1 "
Beans (Snap).....	for 100 feet, 1 quart	Peas.....	for 100 feet, 1 quart
Carrots.....	for 125 feet, 1 ounce	Radishes.....	for 100 feet, 1 ounce
Okra.....	for 50 feet, 1 "	Salsify.....	for 60 feet, 1 "
Onions.....	for 100 feet, 1 "	Spinach.....	for 100 feet, 1 "
Onion Sets.....	for 50 feet, 1 quart	Turnip.....	for 150 feet, 1 "

FOR A GIVEN NUMBER OF HILLS.

Pole Beans.....	for 150 hills, 1 quart	Watermelon.....	for 30 hills, 1 ounce
Sweet Corn.....	for 200 hills, 1 "	Pumpkin.....	for 40 hills, 1 "
Cucumber.....	for 60 hills, 1 ounce	Squash.....	for 30 hills, 1 "
Muskmelon.....	for 60 hills, 1 ounce		

ONE OUNCE OF SEED WILL PRODUCE, OF

Asparagus.....	about 500 plants.
Cabbage, Cauliflower, Lettuce, Kale, Celery.....	about 3,000 "
Tomato.....	about 1,500. "
Egg Plant, Pepper.....	about 1,000. "

CROPS FOR THE GARDEN.

Asparagus.

The cultivation of Asparagus in private gardens is very much neglected in the South. This seems strange, when the crop has attained to so much importance in the truck region and its needs have been so much better understood. The old methods of cultivating this crop in private gardens was very expensive and troublesome. We have known people to go to the expense of excavating a deep bed and laying bricks in the bottom (for what purpose they could not tell, except that that was the way), and then fill the bed, partly placing the roots deep down into the earth, and then covering them at once deeply. The chances were that the deeply-covered roots—many of them—failed to grow at all through the thick cover, and the crop came to be considered a very hard one to grow. Deep preparation is of course needed, for the plant is a gross feeder. If the natural soil is stiff clay, it will pay to haul a good lot of sand and leaf-mold from the woods to lighten it. Put on all the old rotten manure you can well work into the soil, and if you want to grow white stalks (which we do not), make deep trenches—fully a foot deep. Place in the bottom some good compost of leaf-mold and manure, and on this set the roots. One-year-old roots are best. Planting should be done in late February. Cover the roots lightly till they begin to grow, and then draw the earth to them as they grow till the soil is level. Once above the soil, the deeply-buried roots will flourish, while if they had been buried deeply at once many would fail to grow. Keep free from weeds, and in the late fall apply a dressing of kainit at the rate of about 500 lbs. per acre all over the surface. Repeat this top dressing each alternate autumn, and every spring give a heavy coat of manure, and pull the soil up over the rows in a ridge in February. The ridge will warm up more quickly than the level surface and give earlier shoots. They should be cut as soon as the tip appears above the ground, by pulling the soil away and running a knife down alongside the shoot to near its junction with the root, taking care not to injure the other shoots coming near it. This will give the white shoots that some prefer.

But we like the tender green tips without the hard white part, and for our use we plant differently. Preparing the land as in the other method, but making no trenches, we plant the roots but two or three inches below the surface. They then make a much stronger growth and cutting can be made a year earlier than where they are set deeply. Shallow-planted asparagus will also come much earlier in the spring as the roots are near the surface and feel the influence of the sun earlier than the deeply-planted ones. We let the shoots grow about six to eight inches long and cut them at the surface. The whole shoot then is tender and sweet.

Another way we have tried with success, is to sow the seeds as early as the ground can be prepared in spring, and as soon as the young plants are three inches high take them from the seed bed and set them just as you would cabbage plants. They grow off readily, and you will gain a year by this method, for we have cut good shoots the next spring by this plan. Make the rows about two feet to two and a half feet apart, and set the plants about twenty inches in the row. But little cutting should be done till the third year from seed, and but little then, and none after May 1st, so as to give the plants time to develop strongly. A bed once well made is good for a lifetime, if taken care of.

There are several so-called varieties of asparagus, but there is very little difference in them. Seed of any variety will give good results with good culture. That known as the Palmetto is as good as any.

Artichokes.

The plant commonly known as Artichoke in the South is a species of the sunflower, and is not the artichoke of the books. We have never seen the true artichoke in the southern markets, and but once in a southern private garden near Raleigh. The portion of the plant eaten is the undeveloped flower head, or rather the scales of the involucre surrounding the flower head. They are boiled and served with drawn butter, but are not a popular dish with Americans, though much liked by the French. The seeds are sown in the green house or hot-bed in early spring and set out two or three feet apart each way. The plant is perfectly hardy in this climate and remains productive year after year.

JERUSALEM ARTICHOKE.—This is the plant of the sunflower family, of which we have spoken, and is the plant known here as Artichoke. The tubers are sometimes pickled, but there are few persons who desire it as a table vegetable, and the plant gets to be such a troublesome weed in the garden that it is not advisable to give it a place there, although when grown extensively the tubers are considered good food for hogs. A good way to get rid of them in the garden is to turn the hogs in on them and they will soon find all the tubers. This is seldom practicable in the garden, and therefore they had better be kept out. Another plan in use in the West is to plow the ground deeply in July and early August after mowing off the tops. The new, oval, white variety, known as the New White, is a very promising kind.

Beans.

No garden is complete without plenty of beans, particularly of the kinds commonly used in the green pod under the name of "snaps." Then, too, we want plenty of the Limas or butter bean. But as the two classes require different treatment, we will discuss them as distinct vegetables.

SNAPS.—There is always a competition among town and village gardeners to get the first snaps and green peas from the garden, and time and again the gardener who is a little "too previous" has to mourn the loss of his snaps planted during a warm March spell, only to be cut down by a return of cold. But the desire to get ahead of our neighbors often impels the more experienced of us to take some risk with these tender things, which really have no place outdoors until the ground is warm. The Mohawk bean is commonly sown for this early attempt, not because it is the best snap, but because experience has shown that it has a little more hardy constitution than other beans of this class, and will survive and give beans early because of this fact. The soil for the first sowing of snap beans should be the lightest and the exposure the warmest in the garden. Good garden soil that has been manured the year before will do better than freshly manured land. Where the work is to be done by hand the rows may be two feet apart, but for horse culture they should be wider. While we may venture here a few of the Mohawk or the Refugee beans in the ground the last of March or first of April, the main early planting should not be made in the climate of Raleigh till the middle of April. East of us the crop may be risked earlier, and in the upper piedmont and mountain country not till May. There are two classes of snap-beans, the green podded and the golden podded. As a rule the golden podded sorts are most delicate as a vegetable and have fewer strings, but at the same time they are more delicate in the plant, too, and are liable to more diseases, such as the rust, etc. Of the green-podded sorts the Improved Early Valentine is about the best for early as well as late planting. For a later crop, to follow English peas, an enthusiastic grower says there is nothing better than Wood's Cabbage Snap, and recommends it as exceedingly prolific and of the first quality when grown on good soil. The seeds are red. This season a new Wax or golden-podded Valentine has been introduced, which is highly spoken of by seedsmen in whom we have entire confidence, but we have not yet tried it. It is said to combine the earliness of the green Valentine with great productiveness and golden or wax pods. Among the older wax-beans, we prefer the Yellow Eye Wax. Most gardeners sow the beans too thickly in the rows. Two to three inches apart is about right for ordinary soil, and the seed should have a cover of three inches. If the soil is rich more fruit will be made, and the vines will bear longer if thinned to a greater distance than this. The soil should be kept clean and mellow continually till the beans are in bloom.

LIMA BEANS.—Formerly all Limas were climbing beans and needed poles to support them. We now have several sorts that are as dwarf as most of the snaps, and are planted in the same manner, with the exception that these beans will not stand a three-inch cover, but are merely stuck in the ground and barely covered, eye down. While the snap beans will do better on land manured the year before, the Limas will bear as heavy manuring as any crop

grown. They are, too, an exception to the rule of rotation, for they can be grown continuously on the same spot if the manure is given liberally every year. While with most things we prefer to apply the manure broadcast, with the Li as we prefer to place well rotted manure in the furrow under the row and bed on it, and then plant on a raised bed. For the dwarf sorts, the rows and the distance in the row should be as those of the snaps. For the climbing sorts, the hills should be made, if poles are used, about four feet apart each way. But we prefer for the climbing beans to use a trellis made of the galvanized wire netting, now so commonly used for poultry yards. This netting, in widths about four feet wide, fastened to stakes set a few feet apart, with the lower edge a foot above the ground, will be all sufficient as a support to the vines, and will give them a better chance than a pole. The netting can be had for about half a cent per square foot and will last for an indefinite series of years. We have some that has been in use for six years, and looks as good as when first purchased. The wire netting can be had of various widths, and we use it for all sorts of crops that need support. It is neat, and in the long run much cheaper than poles or brush. The narrower widths can be used for green peas, and no one can afford to cut and haul pea bushes from his own woods in competition with it in point of cheapness, if his time is worth anything. In an experiment we made several years ago, we placed some of the wire to rows of peas, and for some other rows we sent a wagon and two men into the woods to cut brush. The result was that the space supported by brush cost more in the first start than that supported on wire, and was, in addition, decidedly unsightly. The brush, too, was gone the first season, while the wire is still good after six years use. In planting the varieties of Lima beans to poles, we plant three to a pole after setting it, and thin out to two plants. In planting to the wire trellis we plant on a manured bed just as for the dwarf kinds, and plant the seed about twenty inches apart in rows that are four feet apart.

VARIETIES OF BEANS.—Of the bush sorts of Limas, we have found Henderson's Bush Lima the best for our latitude. It is the earliest of all Limas, and bears till frost. You cannot get the soil too rich for it, and the beans must be kept picked clean or it will check its productiveness. Burpee's Dwarf Lima is a form of the old large Lima pole-bean. The Large Lima has never been a productive sort in the South, though the beans are large and of high quality, and the dwarf form has the same objection. Dreer's or Thorburn's Dwarf Lima is a form of the old Thick Seeded or Potato Lima. It is more productive in the South than the Large Lima, and in the green state the beans are very large; but in quality we think the Small Lima, of which the Henderson Bush Lima is a form, is much superior, and in productiveness the Small Lima or Sewee always excelled others in the South.

Of the climbing sorts, we should always plant some on account of greater productiveness per plant, though in large areas we are

not sure but we can get as many from an acre with Henderson's Bush as from the Climbing. But we always find that there is a time in summer when the Bush sorts are for a time checked by excessive flowering, and then it is convenient to have some of the climbing sorts to fill the temporary gap. The Small Lima, or Carolina Sewee or Butter Bean, is by far the best for this latitude. There is a form of this known as the Willow Leaf from the shape of the leaves. This is a rampant grower, but with us has never been as productive as the old form. There is also a purple-speckled sort that is quite productive, but it cooks almost black and is not so inviting as the old kind. A bush form of this speckled bean has been sold under the name of Jackson's Wonder. It is very productive, but has the same objection. Where size and quality are desired, the Large Lima will fill the bill, but it is commonly so unproductive in the South that it is little grown. Dreers, or Potato Lima, is more productive than the Large Lima, but is not of as good quality as the Sewee. For general planting, we prefer the Climbing Carolina or Sewee and the Henderson Bush Lima. There are also some varieties of the snap-beans that climb which are desirable, where there is room, on account of their great productiveness. Of these, the Giant Wax is the best of the yellow podded sorts, and the Lazy Wife of the green-podded sorts. Of climbing beans for shelling, green or ripe, we have found the old Dutch Case Knife bean to rank next to the Limas. It is early and very productive.

Beets.

Beets are another vegetable that succeed better upon land manured the previous year than upon freshly-manured land. If fresh stable-manure is added directly to the crop, it is apt to make the roots grow forked. If fertilization is needed, use commercial fertilizer in the furrow under the rows and bed on it, flattening down the bed to sow the seed. It is a point always with the enthusiastic gardener to have this crop on the table at the earliest possible time. Beets will stand quite a frost, if it does not catch them just coming from the seed; but if a hard frost comes just as they are germinating they will generally be destroyed. But to be in with the first, the wide-awake gardener will risk some seed. We therefore sow our earliest beets the latter part of February, and they may be sown even earlier in the eastern part of the state. March will be better in the upper country. Sow in shallow drills about eighteen inches apart. The seed should be sown quite thickly, and when well established thinned out to about four inches apart. In small gardens where the sowing is done by hand, we have found it a good plan to drop four or five seeds in a place about four inches apart. This makes the thinning easier.

A sprinkling of powdered nitrate soda as a top dressing when the plants are one-third grown will produce a rapid growth. In applying, be careful not to apply so as to touch the foliage, unless during a rain.

VARIETIES OF BEETS.—There are few sorts of beets grown for table use. We have found the red Bassano the earliest, but private gardeners, following the lead of the truckers, have generally discarded it. The truckers threw it aside because its large top interferred with bunching and its light color was an objection to those who think that a beet to be good must be a deep red color. But those who put quality ahead should use the Bassano. Some years ago quite a furor was gotten up for the Extra Early Egyptian beet. This sort is as flat in shape as a flat turnip, and is of a deep red color, and has a small top and is early. But this is the sum of its good qualities. It rapidly loses what quality it has and becomes woody and worthless.

We cannot recommend the Egyptian for private gardens. Latterly another sort has been introduced under the name of Eclipse, which is a round and early beet of a deep red color and small top. This is of good quality, and for general use as an early beet can be recommended. For a later crop there are several sorts of the Blood turnip beet, and for winter use the Long Blood beet. This should be sown in midsummer for the winter, but is little used in the South, so that it is rare to find beets in winter in our Southern markets. The Long Blood can be allowed to remain where it grew all winter by throwing a furrow to each side, and will be found a desirable material for winter salads. The Silesian sugar beet, ordinarily considered a stock beet, is a good table beet as well. It is white, and rough in appearance, but more tender and sweeter than many other varieties, and has excellent flavor. It is later, however.

The Swiss Chard or Spinach Beet is not grown for the root, but for the large leaf stalks. The seed are sown as other beets, and thinned to about eight inches in the row. As soon as the tops are well developed, the outer leaves can be pulled from time to time all summer. The stalks and midrib of the leaf are boiled like asparagus, and make a most delicious vegetable, very much resembling tender asparagus. The blades of the leaf can be cooked and served as spinach, and can hardly be distinguished from that vegetable.

BROCCOLI.

Broccoli is simply a variety of cauliflower that is more commonly grown for fall use, as it is rather more hardy than the true cauliflower. Lee's Sprouting Broccoli is a branching sort that is esteemed in some places. Cultivate same as cauliflower.

BRUSSELS SPROUTS.

Just why this fine vegetable is so completely ignored in the South, while the collard is grown so extensively, it is difficult to say. Few people in the South—and for matter, anywhere in this country—have ever seen a plant of Brussels Sprouts. At the North, the climate is too severe for its best success, and at the South our people have been content with the collard. The plant is in general similar

to our collard with a loose head. But the tall stem is completely packed through its whole length with miniature heads of little cabbages about the size of a walnut with the hull on. Next to the cauliflower it is the most delicate dish of all the cabbage tribe. It needs a rich clay soil, and one inclined to moisture. The culture is identical with that of the collard, the seed being sown in early summer and the plants set out as collards are. The heads are eatable after frost, and should stand where they grew all winter. The little heads are stripped off as wanted for use. They can be planted two feet apart in rows two and a half feet apart. The Roseberry is the variety commonly grown.

Cauliflower.

There is no vegetable that private gardeners more commonly fail with than the cauliflower. To grow cauliflower in the South we must have them either very early or very late. It is of no use to attempt the heading of cauliflower in this climate from May to September. They must be early enough to head in March or April, or late enough to head from October to Christmas, if we expect fairly good heads. The early crop can only be had here by the use of glass. We sow the seeds in a rich bed the middle of September; and the plants must not be allowed to receive any check till heading time in the spring, or the result will be little buttons in place of large heads. As soon as the plants are large enough, we set them in cold frames, planting six plants to each three by six foot sash. The space between the plants is then filled with lettuce plants, and as the nights become frosty the glass is put over the frames at night, but plenty of air is given in all sunny weather, and when warm the sashes are stripped off. The lettuce will be headed and ready for use during January, and is cut out of the way and the cauliflowers well cultivated. It may be needless to add that the soil in the frames should be as rich as it can be made, for poor soil will not grow cauliflowers. After the lettuce is cut out, a dressing of nitrate of soda should be placed around the cauliflower plants. By the latter part of February the plants will be getting up against the glass, and we must gradually harden them to full exposure. By the end of the first week in March they should be fully exposed and the sashes removed to extra frames to harden off the tomato and other plants. Cultivation of the cauliflower should be kept up for a while and the heads should appear the latter part of March and in April. In this way it is easy for an experienced man to grow heads that will weigh six to seven pounds each, but a beginner will at first have more buttons than heads. For this crop there is no better sort than the Snowball, and Danish grown seeds should always be used. For a late crop, which is an extremely uncertain one, sow seeds of the Snowball or the Early Paris about the middle of August, and urge them in their growth in a moist clay soil as rapidly as possible by the heaviest kind of manuring and fertilization. If the season is favorable or you have facilities for irrigation

you may get good heads in November or December, but more frequently there will be failure if there is any lack of fertility or moisture. But good cauliflowers are always worth taking extra pains to get, and skill and perseverance will be rewarded.

Cabbage (Early).

There is no difficulty in getting early cabbages in the South, and our market gardeners succeed well with them. But it is rare to see in private gardens here any really early cabbages, for the simple reason that private gardeners generally never think of gardening except in the spring time. It is an easy matter to have a constant succession of cabbages fresh from the garden from March till July, after which the growing of cabbages anywhere out of the high mountain country of our State becomes a difficult matter. But there is no good reason why every garden should not have an abundant supply of cabbage during spring and early summer if proper attention is given to them. For the earliest cabbage we begin by sowing the seed in a rich bed the last week in September. Sow the seed in rows and not broadcast so that they may be thinned and cultivated, for it is as essential with them as with cauliflower that we should not allow the plants to get stunted, for if any check happens to them in the early stages of growth they will run to seed in the spring instead of making heads. Our eastern truckers set the plants on well manured beds in November, but in private gardens where there are cold frames it is preferable to transplant the plants thickly into the frames and set them deeply, so as to protect the stems from hard freezing. But the glass should not be placed over them except when a temperature below 25 degrees above zero is expected at night, the object being merely to preserve them in good condition, and not to make them grow in winter. As early in February as the soil can be gotten into proper condition the plants should be set. The land should be very heavily manured, and the cultivation should begin at once and be continued frequently, so as to keep them growing rapidly. During their early growth apply a dressing of nitrate of soda alongside the rows at rate of 100 pounds per acre. They should be headed by the last of March or early in April. The varieties to use for this purpose are the Jersey Wakefield and Tait's Pilot. We prefer for private use the last named. For a succession crop we sow in the cold frames in January seed of Fottler's Brunswick, or Henderson's Succession. These we transplant in the frames a few inches apart as soon as they are large enough to handle, and keep the glass rather close till they recover from the transplanting, after which they should have air on every favorable opportunity. These plants will be ready to set in late March, and the varieties make much larger heads than the extra early sorts. Another sowing should be made in early March in the open ground to succeed these and to prolong the cabbage season till July.

The early cabbages are seldom troubled with the larvæ of the

cabbage moths as the later ones are, but they are sometimes badly affected by the cabbage aphis or louse. We have never found it of any use to try to combat the aphis in the garden. The best plan is to pull up the plant as soon as it is seen to be lousy and burn it to prevent the insects from spreading to others. The later crops are troubled with the Harlequin or terrapin bug. Remedies seem to be usually powerless against this insect, too, unless strong enough to destroy the plants, though we have succeeded in killing them with kerosene emulsion in full strength without killing the plants. But the best way is one that has been recommended by Mr. Weed of the Mississippi Station. This is to sow a row of mustard between the rows of cabbage. The bugs are very fond of the mustard and will gather on it at once. The insects and mustard are then destroyed by spraying with pure kerosene. The green worms, the larvae of two species of moths or butterflies will become troublesome on the later plants. For these we have found nothing so good as common salt and air-slaked lime mixed in equal parts and sprinkled on the plants. The application is to be renewed when washed off by rain.

Cabbage: (Late).

The difficulty in growing late cabbages in the South has led to the universal use of the more resistant Collard. While we have nothing to say against a well-grown collard, if properly bleached in winter, we prefer to grow the better cabbage. In the mountain section of the state there is no difficulty in growing the finest of winter cabbage, if the remedies above given are used, by sowing the seed in June and transplanting in July to well manured, moist land. But from the mountains eastward the difficulty increases, and it is practically impossible for us to have cabbage headed in the early fall. But with proper care we can grow fine winter cabbage. For these, sow seed of the Premium Flat Dutch about the first or second week in August in a rich and moist bed, and transplant to a moist piece of land, made as rich as possible, in September. Urge their growth by frequent cultivation and applications of nitrate of soda, and keep the worms off by the use of the lime and salt mixture, and we can get well-headed cabbage in December.

KEEPING CABBAGES IN WINTER.—We seldom have any weather to hurt cabbages till after Christmas. We therefore do not attempt any protection till about that time. Then go through the patch and turn the heads to the ground with the head pointing to the north. Then bank the soil over the stem and the lower part of the head, leaving the top open. We have them point to the north rather than towards the south, as some do, because the sun shining on them when frozen is apt to hurt them. Any heads that are not well-headed will head during the winter, if the leaves are well gathered together in burying them. By careful attention we can grow as good winter cabbage here and eastward as anywhere, and need not depend on the collard. The same plan for winter protection

should be used with the collard. There are a great many varieties of cabbages grown, but those we have given will be all that any one will need, unless some may wish the purple cabbage for pickling, and this can be grown in the same way as the winter cabbage.

Carrot.

The carrot does not seem to be a favorite vegetable in the South. At least it is very seldom seen here. The seed can be sown quite thickly, just as beets, from February to July, in rows about eighteen inches apart and one inch apart in the row, and covered about one inch. When they are well up, thin to three inches in the row for the small sorts, and five inches for the Long Orange. They should be cultivated perfectly flat and never hilled, for they naturally throw the upper part of the root above the soil. The short forcing sorts may be sown in frames in the fall and had for use in soups through the winter. For this purpose the Early French Forcing is the best. For early use in the open ground, the Early Short Horn is the favorite. For late sowing in July for winter use the Long Orange is the best. These are left in the ground like late beets and parsnips, and taken up as wanted. This sort is better for cattle food than for the table. The soil for carrots should be light, and they do not thrive with fresh manure, which is apt to make them (and other roots of the same character) grow forked. The little forcing carrots grown in frames make a very delicate addition to soups, but the larger ones are too strong tasting for most people.

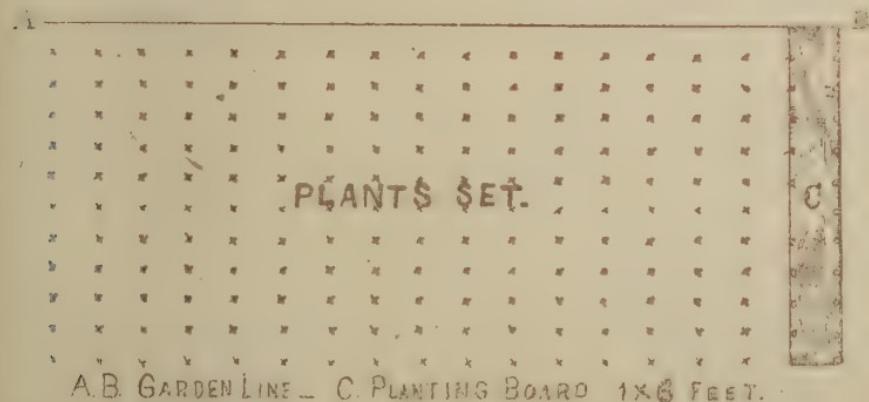
Celery.

This is a vegetable which every one wants, but which few in the South grow successfully. Celery is a marsh plant of cool latitudes, and does not thrive under hot and dry conditions. The great difficulty in the culture of celery in the South is in carrying the plants through our long summers. If we have good, strong plants in September, there is no difficulty in growing a good article on proper soil. But on a hard dry clay soil, where there is no means of artificial irrigation, the culture of the plant presents difficulties almost insuperable. On land naturally moist, or where there can be a plentiful supply of water furnished to it, the plant can be grown to as great perfection here as anywhere. We cannot, however, compete with the northern growers in producing celery in summer, for the heat prevents it, except in the mountain country, where it should be as easy to produce it as at Kalamazoo. In sections where the climate renders it practicable to grow early celery, the seed should be sown in a frame in January or February, and transplanted in the frame as soon as large enough to handle, and finally transplanted to the open ground in May. This can be bleached in July by placing boards on edge on each side of the row. But there are few people who care for celery till turkey time, and the crop can be grown in all parts of the state for this purpose.

The great difficulty that private gardeners have is growing the plants till planting time, and where but a few plants are wanted it may be best to buy the plants ready for the first transplanting from those who grow them in quantities for sale. But it is an easy matter with care to grow the plants. The best place to sow the seed is on a moist border shaded from the south sun by a board fence. Put the bed in the finest order, and mark shallow lines across it not over half an inch deep and wide enough apart to allow a small hoe being used to work the plants. Sow the seed rather thickly on these lines, and then pat them down with the back of a spade, which will cover them sufficiently. Now spread over the bed some old bagging, and with a sprinkler water the soil on top the bagging. Watch the bed closely, and as soon as the seed begin to germinate, raise the cover off them, but keep it over them and propped up on stakes to shade the bed. When the plants are an inch or two high and are large enough to handle, transplant them to a similarly situated bed and allow two inches between them, at the same time nipping off the tap root to an inch long. This transplanting I consider essential to get plants of the proper robustness to transplant later. The celery plantation should be made on the most moist land in the garden, where some early crop has been grown that required heavy manuring, for we prefer not to add manure to the land at planting time. If some additional manure is needed, it is best to use a high grade fertilizer that has a good percentage of nitrogen (ammonia) and potash at rate of a ton per acre, well worked into the soil broadcast where the beds are to be planted a week before setting the plants. The tops should be sheared once or twice in the bed before the final transplanting, so as to get stocky plants. The seed should be sown in late April, but as we have said, the small plants can be bought from the seedsmen North for the first transplanting, and save the trouble of growing them from seed. If these plants are bought they should be gotten about the first of June and set in the bed as recommended for those grown at home. The final transplanting and growing of celery is the point in which the greatest difference comes between northern and southern culture. At the North, the growers are obliged to lift their crop in the fall and store in pits and cellars. They therefore grow it in single rows three to four feet apart, so that horse labor can be used when it is grown on a largo scale. Here it is not necessary to lift the crop, and therefore we should grow it so as to earth it up most economically. The great difficulty here in some winters is to keep it from growing all winter and running to seed. We therefore plant the celery in beds, because it is more economical of labor to earth up a bed than to earth up the same number of plants in single rows, and also because the single rows, earthed up, leave the sides of the narrow banks exposed to the sun, and warm up to such an extent that the celery is kept growing when we want it to become nearly dormant. We can accomplish this better in a broad, flat-topped bed, than we can in single rows. Planted as we plant it, an acre

will contain about 37,000 plants. We set the beds five feet wide and of any convenient length, and where a number are planted a space of eight feet is left between the beds, for the purpose of getting soil for earthing. The beds are never sunk, but planted upon the surface. The rows run crosswise of the beds, and are one foot apart, with eleven plants in each row, thus making them six inches apart in the row. The implements made use of in planting these beds are peculiar, and can be better understood by means of the diagram.

THE PLANTING BOARD.—The planting board is used as a rapid means for keeping the rows uniform and straight, and to prevent the necessity for treading on the prepared land. It is made of an ordinary piece of one inch plank, twelve inches wide and six feet long. The ends of this board are cut exactly square, and notched or cut on each edge, beginning six inches from each end, and six inches apart. To use the planting-board, we stretch a garden line along the edge of the proposed bed. The planting board is then laid exactly perpendicular to this line. A plant is then set at each notch of the board. The board is then moved so that the notches correspond with the plants already set, and care is taken to keep it exactly square with the line at the end. Another row of plants is set at the notches on the side of the board, and this process is repeated until the whole bed is planted. In this way the rows are kept exactly straight both ways, and the bed will be five feet wide with eleven plants in a row, and the rows one foot apart. The planter stands on the board in planting, and thus avoids disfiguring the bed with footprints. In the cut the board is shown six inches short at the lower end.



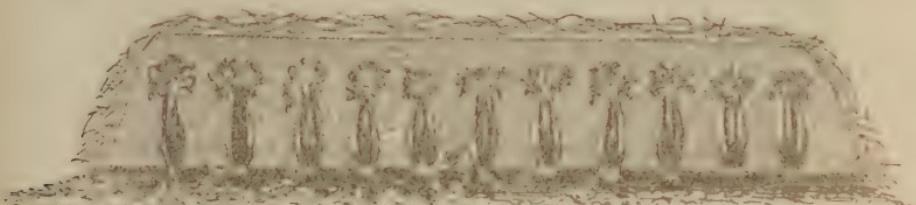
CULTIVATION AND AFTER TREATMENT.—After planting, the only thing necessary for some time is to keep the beds well cultivated and free from weeds.

Celery, as already stated, is a plant which is native to marshes and wet lands, and never reaches its best development in our hard-baking upland red clay, though fair crops can be grown in moist

seasons. When a choice of locations can be had, celery should always be planted in low lands, where it is practicable to irrigate it in dry weather. Success then will be certain in almost any season. The black peaty soils and swamp lands of eastern North Carolina are as fine celery lands as can be found anywhere. The soil should be as nearly perfectly level as possible, not only to facilitate perfect irrigation, but also to prevent washing, for when a proper location is found it is best to keep the celery patch in the same place year after year, only giving attention to the fact that it must be heavily manured every year, no matter how rich it may seem. In cultivating celery, at all times it is important that the plants should never be handled while wet with dew or rain, as such handling will cause the leaves to rust and turn yellow. As the celery grows it will be found that the outer leaves will have a tendency to spread flat out upon the ground. To counteract this it will be found necessary to put it through what is called the handling process about the first of October. This is done by putting earth enough around it to hold the leaves upright, and no more than is sufficient to do this should be used, for the final earthing-up should be delayed here until November and December. Any attempt to blanch celery early in the fall in this climate will result in a hollow, rusty and inferior product. Christmas is about as early as we should expect well bleached celery, and from that time until March we can have it as fine as anywhere—in fact better, in my opinion.

The first handling, to put the celery in an upright position, should be made in October. We formerly used for this purpose two boards, set on edge across the bed between two rows of celery and held nearly upright by pegs at each end. The earth was then thrown between the boards by two men standing on each side, who afterwards withdrew the boards so as to leave the soil in a ridge between the rows. We now do this in a simpler and better way. Provide two twine strings twelve to fifteen feet long with a pointed peg tied to each end. Stick a peg opposite the end of a row and about a foot away. Then take one turn of the twine around each plant in the row so as to draw the leaves into an upright position, and finally fix the other peg into the soil opposite the other end. With the second cord and pegs treat the next row in the same way. Now shovel the fine earth from the vacant spaces on each side of the bed between the rows, and then pack it tightly by hand against the plants. Use earth enough, and no more, to hold them firmly in an erect position. Now untwine the strings and use them in the same manner on two more rows, and so proceed until all the bed is handled up. Be sure to do this when the celery is dry, as before stated. In the subsequent earthing, if the celery has outgrown its upright position, it may be necessary at first to use the strings again, but if the spaces between the beds are kept finely cultivated, it is usually sufficient to hold the plant in the hand while an assistant shovels fine earth around it. It is important that the earth should be kept out of the heart of the plant. When the final earthing up for bleaching

is begun, care must be used to build up the outside of the bed at least six inches wider than the rows are long, so that the five foot bed will be enclosed in a bank of earth fully six feet wide. Keep adding earth as the tops elongate, and finally—about Christmas—cover entirely over with earth, and cover with straw or forest leaves, to keep frost out.



CROSS SECTION OF BED OF CELERY, EARTHED UP AND COVERED WITH STRAW.

As before intimated, while celery grows to a large size in the black boggy soil of the Kalamazoo celery gardens, the best celery, so far as solidity and flavor are concerned, is grown on a moist clay loam. We have a great abundance of black peaty soil in eastern North Carolina that will grow celery as large and showy as the Michigan lands, but those who have moist loamy clay soil are very well situated, particularly if located near a stream so that irrigation can be practiced.

VARIETIES.—Numerous varieties are named in seedsmen's catalogues, but it is well to bear in mind that the dwarf celeries so popular at the North are not so well adapted to the southern climate. Golden Heart is one of the best, and we have good reports of the Giant Paschal, but have not grown it. A good strain of the old Giant White Solid is hard to beat. Henderson's White Plume is liked by some, but I have never found it to do well here. Sandringham is a very fine sort, intermediate between the dwarf celery and the giant.

Celery is shipped tied in bunches of four or five stalks, packed in crates with damp moss. Celery grown here must seek its market in our own towns or southward. We cannot compete with the northern growers for the northern markets.

Collards.

While we are certain that there is no part of North Carolina where good crops of the best winter cabbage can be grown, if treated as we have described, there are some who are fond of the collard, which certainly will grow with less attention than good cabbage. Seed for collards should be sown by the first of June, and for the garden we would select seeds of the more dwarf growing sorts, some of which have a tendency to make something like a head. There is an old superstition that collards and late cabbages should not be cultivated during the dog-days, but if you want good ones do not pay any attention to this. Set the plants about three feet apart in as rich land as you have, and do not spare the manure.

Then cultivate them thoroughly, and never allow the soil to remain hard and crusted—dog days or any other time. When the crop is well grown, and cold weather is at hand—say about the middle to the last of December—turn the heads down *towards the North*, and cover all the stalk and the lower part of the head with soil, but leave the upper part of the top uncovered. This method will protect the most tender part, the base of the head, and the head being towards the north will not have the sun shining on it when frozen, which is the cause of damage. When well bleached by this cover they are ready for the table, for those who like them; but we had far rather have a good hard-headed cabbage.

Corn (Sweet).

The sweet or sugar-corn is little grown in the South, as it has not been found to have the requisite stamina to thrive here, and the ears are so eagerly sought for by the boll worm that many persons have come to the conclusion that it is useless to try to get any but our common field varieties. It is true that our southern field corn is a far sweeter article than the northern field-corn, but it lacks the delicate sweetness of the sugar-corn. One of the main reasons for the lack of success with the wrinkled-grain sugar-corns here is the fact that the seed planted are usually bought from the northern seedsmen. Corn of no kind does its best when first brought from a southern to a northern latitude, nor does it do any better brought from a northern to a southern latitude. The best results are to be had from corn selected for seed in the latitude where it is to be planted. For this reason we have for years been trying to breed up a sweet corn that would suit our climate. We started six years ago with a corn that was a cross of the Leaming and the Mammoth sugar-corn. The cross was made by Mr. McCluer of the Illinois Station, and as the cross was just what we wanted to start with I was glad of the opportunity which Mr. McCluer's kindness gave to save a year. In making this cross, it was hoped to add the earliness and vigor of stalk of the Leaming to the good sized ear and sweet character of the Mammoth sugar. At first the corn came mixed all over the ear with plain yellow dent grains (like the Leaming), plain white ones, wrinkled white ones and wrinkled yellow ones. We selected every year the wrinkled yellow grains as showing the cross best, the sugar-corn being wrinkled and white, while the Leaming is yellow and smooth. Each year of planting we have gotten nearer to our ideal—a yellow, wrinkled sugar-corn for the South. It is an early sort, giving good ears for the table by the middle of June here, is a stout but short grower, and almost invariably makes two good ears to the stalk. We hope to grow enough the present year to enable us to distribute packages to all parts of the State the coming fall so that it can be tested. These packages will be small, and should be grown apart from all other corn for the seed. A gentleman to whom we gave a little last spring reported good success in the southeastern part of the state, but said that the

cook left him no seed. As the Station does not propose to keep growing the seed for distribution, all who get any should save the first crop for seed, so that the variety can be generally scattered in the State. This will be known as the N. C. Station Sugar-Corn. It can be planted in gardens about four feet between the rows and ten inches in the row. Most beginners make the mistake of having the stalks too close together. With four feet rows each stalk should stand not more than one foot from the next one. As a considerable number of the seed fail to germinate, this should be remembered when sowing. Stowell's Evergreen and Country Gentlemen are fine garden varieties, and if bought of reputable seedsmen will give good satisfaction.

Cucumbers (Early).

The cucumber is another vegetable which can be materially advanced in earliness by a skilful use of glass. For forwarding it we need a good supply of flower pots of the four-inch size. These we fill with a light rich compost made of rotted sods and stable manure. The pots are then packed closely together in the cold frame about the first of March and the seeds are scattered on the surface. More compost is then sifted over all, and well watered with a sprinkling can. The glass is kept close till the seeds germinate, after which air must be given in sunny weather and the young plants kept in a healthy growing condition. As the rough leaves appear, thin the plants to two in each pot. When the weather is finally settled and the ground warm, the plants are to be knocked out of the pots with the ball of earth and roots entire, and set in well manured hills somewhat deeper than they grew in the pots, and five feet apart each way. Seed are also sown in the open ground at the same time that the forwarded plants are turned out in late April. Put plenty of seeds in the hills to guard against the ravages of the bugs, and thin to two plants in a hill after the rough leaves are grown. We never make elevated hills for cucumbers or melons, but dig a hole large enough to hold a shovel full of rich compost, plant the seeds and cover so that the land is level. It is always best to use plenty of seed, for they are liable to the attacks of the striped cucumber beetles which sometimes destroy the plants in the seed leaf state. The best preventive of this trouble is to dust the young plants over with raw-bone meal. I have never known this to fail in driving the bugs off, and it helps the plants at the same time. There are a number of varieties of the cucumber, but we find that for general use the Improved White Spine is as good as any. Two years ago the Japanese Climbing Cucumber was introduced, and we have found it to be well suited to our climate and to be more resistant to the summer heat than the old sorts, giving cucumbers through the entire summer. It does better when allowed to run on wire netting.

Cucumbers (Late).

We have never had as good success with late cucumbers in this locality as we had further North, but where they can be kept clear of the borer they are enormously productive. The seed should be sown here in early August, in hills prepared as for the early crop, using plenty of seed and thin to two plants in a hill after the danger from the beetles is past, and the plants have well developed rough leaves. In the mountain section, the sowing should be in middle of July. For this crop we prefer the Long Green, as they are grown for pickles mainly and this variety makes the most solid pickle. As the cucumbers for pickles are not wanted of a large size they should be cut daily, as soon as the size of one's finger. Always cut, never pull, a cucumber, and cut with a small piece of stem. The yield will be much greater if the cucumbers are kept cut closely when small than it will be if they are allowed to grow large.

Egg Plants.

This delicious vegetable is not so much cultivated in our gardens as it should be. This has arisen largely from the difficulty of getting the plants from seed in the open ground. If you have no greenhouse, hot-bed, nor frame, it will be best to buy the plants at setting-time from some one who grows them early in pots. Plants pulled from a bed are seldom worth planting, as the egg plant is slow to recover from a serious check. Our practice is to sow the seed in shallow boxes in the greenhouse the middle of February. The young plants must be lifted from the seed-box as soon as they can be handled, as they are very apt to damp off at this stage. Transplant to other boxes about two inches apart. When well established in these boxes we lift again carefully and plant them in pots of the three-inch size, using for all plantings the same compost of rotted sods and manure that we have before recommended. When they fill these pots with roots, we re-pot with four-inch pots, keeping them in the greenhouse all the time. The object is to get as large a plant as possible by the time the weather is warm enough to plant them outside, which will not be till May. It is of no use to attempt to harden off the egg plant to a low temperature, as we can with tomatoes and some other tender things. Any such attempt will result in stunted plants that will take the entire summer to recover. The soil for egg plants cannot be made too rich. In fact, it is perfectly useless to plant them in any but the very richest soil. They prefer a sandy loam, and will not do much in a cold clay. We set the plants about three feet apart each way. The cultivation must be rapid and clean, and no crust should be allowed to form around them. Success depends on their being kept growing rapidly all the time. When well grown they are enormously productive, but when they get stunted there is no plant that will give poorer returns. The Colorado potato bug is as fond of them as of the potato, and if not kept in check will destroy the plants. On a plant

of this nature we prefer to depend on hand picking rather than use poisons. The bugs will put in an appearance in the mature state soon after the plants are set, and begin laying eggs on the under-side of the leaves. The eggs are laid in patches and are of a bright orange color, so that they are easily seen on the large leaves. Destroy these patches of eggs as fast as laid, and at the same time all the insects engaged in laying them, and you will have few to kill when they hatch out and begin to eat. The Black Pekin is the best quality, but is small. The best and most productive sort for general use is the New York Improved Purple. There is a white fruited sort that is very good, but we have found it unproductive. Most people fry the egg plant in slices, but they are more delicate if simply cut in thick slices and placed in a pan in the oven till baked brown and well done.

Herbs.

Our modern gardens are too generally bare of the sweet herbs that our grandmothers so delighted in. Thyme, sweet marjoram, sage, etc., are now seldom found. Sage is in more demand now-a-days than most other herbs, and most people imagine that the way to grow it is to keep a lot of old bushes from year to year and pick the leaves singly and tediously from the stems. These old bushes soon become mere weed nurseries and a standing nuisance. Now there is no reason why every family that has a garden should not have at all times a plenty of sage and other herbs. Sow the seed on a good rich border in March. Sow in rows so that they can be cultivated. As soon as the green peas, or some other early crop is out of the way, transplant the sage plants in rows about two feet apart and six inches in the row. Long before frost they will have met across the rows, and should be cut off at the ground. The stems will be green and tender and as good as the leaves for flavoring purposes. Dry the whole in the shade, and it is ready for use. A second crop can usually be cut before frost. Do not try to keep the old plants over. If your neighbors want them, give to them till they learn that they can grow more from seed every year than they can from old bushes. Other perennial herbs can be treated in the same way.

Horseradish.

This is grown from slips of the roots, and it, too, is best treated as an annual, but for the use of most families, a few roots set in some out of the way place, will take care of themselves and give no trouble in the garden.

Kale (Borecole).

This is an important crop for the southern market gardeners, but is little used in private gardens, most people being content with the brief crop of turnip tops in the spring. The plant is Borecole, and is known among truckers as "Sprouts." The Blue Curled Kale is the sort most commonly sown by truckers about the middle of

August in drills about thirty inches apart, using about a pound and a half of seed per acre. For home use we prefer the Green Curled Dwarf Scotch Kale. This can be sown about the first of August and transplanted in September about ten inches apart in the row. After frost, it gets very tender and makes the best of greens. Or it can be sown in rows about twenty inches apart in September, and left to remain for cutting during the winter and spring.

Kohlrabi.

This is a vegetable seldom seen in the South. Just why, we cannot say, for it is easily grown, and after Cauliflower and Brussels sprouts, we consider it the best of the cabbage tribe. In growth it looks intermediate between the cabbage and the rutabaga, the swollen, turnip-like stem being the part eaten. The seed should not be sown here in the spring, as the large plants will not endure our long summers, and it is not wanted till cold weather. We sow the seed about the last of July in rows about two feet apart, covering not over an inch, and thin out to six to eight inches apart. They are perfectly hardy and can remain where they grow, to be used during the winter. There are two sorts, the White and the Purple. I have always used the white. The Kohlrabi needs a rich moist soil, and heavy fertilization is needed to produce fine bulbs. The bulbs are peeled and boiled like cabbage or turnips.

Leeks.

It is hard to understand why our people so persistently use the green onions in place of the Leek in the spring, for the leek is a far more delicate vegetable. Sow the seed in March, in open ground, and transplant into rows eighteen inches apart in May or June, and set the plants six inches in the row. Set them deeper than onions, so as to have a long bleached stem, for the bulb does not swell out round like the onion. The plants will be ready for use all through the following winter, and are so hardy that there is no need for taking them up till wanted for use. In the latitude of Raleigh it has been found by the same enthusiastic gardener previously mentioned that leeks do best when sowed in rows and allowed to remain. Transplanted leeks grow larger in some sections, but here the transplanted plants do not make sufficient progress before our hot weather sets in. When the sun gets powerful, growth is practically suspended until fall. About October 1st the plants should be hilled up a little, and about November 1st they should be hilled as high as practicable. It is best to sow them in two or three long rows eighteen inches apart, and have some vegetable on each side that will be out of the way by October 1st, so that dirt can be procured from each side to use in hilling up. Unless hilled up, they will not bleach well, and the stalk is liable to be tough. Clipping the ends of the leaves once or twice during the summer is an advantage, as it makes them grow larger.

Lettuce.

There are few gardens in the South where we find any lettuce except for a short time in the spring. Now to our taste the lettuce that is grown in the open ground in the spring is very poor stuff, when compared with that which any one can have here all winter with little trouble. As I write this (February 5th) my family has been enjoying an abundance of lettuce since Christmas, and will have plenty till the weather gets too hot in the summer. We use an ordinary cold frame covered with the glass sashes already described. The seed is sown on an outside border in September, and when large enough is transplanted to the frame and set about eight inches apart. The sashes are placed over the bed and shaded till the plants are well over the transplanting. Then the glass is only put over the bed during frosty nights and cold weather, the object being to keep a regular but not too tender a growth, for if the glass is kept over them too closely the growth will be tender and easily hurt by sudden cold waves. At the same time the lettuce is set in the frames, the cauliflower plants are set to take the place of the lettuce after it is cut out. Where there are plenty of sashes, the family can be supplied with radishes in the same way in winter, by sowing seed of the small round radish in rows in the frames similar to the rows of lettuce. We are now eating radishes grown in these frames.

There are a great many varieties of lettuce in cultivation. For fall sowing and growing in the frames the only variety we consider of real value for family use is the Boston Market. The black seeded Simpson is an early and good sort but does not head. There are other varieties which are good for spring planting in the open garden, but have no value under glass. These are the Hanson, which makes the largest heads of any, and the Deacon and the New York, which stand hot weather better than any. But really a hot weather lettuce is of little use, as it becomes bitter and milky, and no one wants it at that time. In the open garden, the lettuce can be set between the rows of early cabbage, as it will be out of the way by the time the cabbage needs all the space.

Melons (Musk).

Muskmelons or canteloupes can be forwarded in the same way as the cucumber and the fruit obtained much earlier. We grow them in the same manner at all times that we grow the cucumber, but make the hills farther apart, or full five feet (six would be better if there is room). The variety we would always plant in the home garden is the Emerald Gem. This, in our opinion, is the best flavored melon grown. The skin is a dark green when ripe, and the flesh is very thick and orange color. The Jenny Lind is the favorite early sort with our truckers. It is too small. There are a large number of sorts grown, but for home use the Emerald Gem is the best we know of. If a green-fleshed melon is preferred, the Hackensack is as good as most of the varieties and is productive.

Melons (Water).

There is not generally room in the home garden proper for the watermelon. It needs sandy land and is indifferent to its general fertility if there is a richly manured hill for its roots. As in growing muskmelons and cucumbers, we do not make a hill, but a hole, for the watermelon, and fill it with a rich compost. For home use, plant the McIver Sugar Melon or the Jones. The first named is the best watermelon in our opinion that is grown, and the Jones is a good second.

Mushrooms.

We know of few efforts to grow mushrooms in the South. Most people who are fond of them depend upon the chance of getting the wild ones, and imagine that the cultivation of the mushroom is an art too difficult for the amateur. The fact is that there is nothing so easy to grow after you "get the hang of it," as a mushroom. At the same time there is no crop in the culture of which beginners are more certain to fail utterly. It is easy for one who knows how to grow them to tell just how he does it, but we have never seen any one succeed in growing good crops of mushrooms from reading how, or being told how, to do it. All must learn from their failures just how minutely they must observe the conditions for success. When once this is learned, there is no crop easier, and the grower wonders how he could have failed in the first place. But let him tell his neighbor just how he succeeded, and his neighbor cannot go to work and at once grow the mushrooms. The success depends first on a plentiful supply of fresh horse dung, free from litter. Where enough cannot be had at one time, it may be spread out, secure from rain, and so that it will not heat. When you have enough for a bed, which may be made in any out-building, pile the manure up out doors so as to start it to heating. Turn once and allow to get warm the second time. Now pack it evenly in the space marked out for the bed, and ram it down tightly with a wooden maul. Make the bed two feet thick and the top rounded or sloping, so as to increase the surface. If the manure is very dry when packing into the bed, moisten with a sprinkler and warm water. Place a thermometer in the mass and watch the heat. It will rise for a while, but the point is to watch the decline. When the heat begins to slaken and has fallen to about 85 degrees, then spawn the bed. The spawn is usually sold in the shape of dry bricks, or in boxes, not moulded in bricks. I prefer the bricks. Chop them with a hatchet into lumps the size of a hickory nut. Stick these lumps all over the bed just covered in the dung and about two inches apart. Then scatter all over whatever dust or small particles are made in chopping the bricks. Cover the bed with straw, and if it has gotten very dry sprinkle the straw with warm water. Watch closely, and as soon as you perceive a fine thready mould running through the bed, take off the straw and cover it with about two inches of good garden mould. Do not use woods earth, as you may get wild

fungus growths that are not wanted. Now cover with the straw again, and if all goes right you may expect the mushrooms to pop up in about six weeks, and will continue to come up for two months. The exact point of moisture in the bed is the difficult matter to regulate. It must not be wet, but it must never be dry. Now, if the beginner will take these directions and succeed the first effort in growing mushrooms, he will surprise me. But if one is determined to find out how to grow them he will all at once find that he is getting them, and sees how easy it is after all. The best time to begin the bed is in September, and again in February. It is of no use to try to get them here in hot weather, unless we had deep eaves to grow them in as the French have. *Agaricus Campestris* is the species commonly grown, but of late there has been a new species introduced to cultivation, *Agaricus Subrufescens*, which is said to be far more productive. The place where they are grown should have an even temperature of 45 to 65 degrees. Some growers mix the loam and manure in preparing the bed, but we have always had better crops with a bed made solely of horse dung. We prefer to make the beds narrow and deep rather than only about eight inches thick, as some writers recommend.

In removing mushrooms from the bed take all away clean, as any part of the stem left will decay and damage the bed. Do not allow them to remain and get too old. No mushroom should be gathered to eat after the gills have turned black, as they are then unwholesome. The proper time to gather is just as the veil breaks from the stem and the gills are a pale pink.

Okra, or Gumbo.

This vegetable is generally popular in the South, and any one who can grow cotton can grow its near relative, the Okra. The seed should not be planted till the ground is warm, and the rows should be about three feet apart and the plants thinned to about 18 inches apart in the row. A rich, warm soil and clean culture are the essentials for its culture. The seed pods should be cut as soon as they are large enough and before they get tough and stringy. The White Velvet is the best variety, as it is free from the stinging prickles that make the older sorts so annoying to gather.

Onions.

It has been for generations the almost universal opinion that to grow onions in the South, it is necessary to have the sets or small bulbs, and that good onions could not be grown from the seed the first year in this climate. But this has been proved to be an error, for as good onions can be grown here as anywhere if sown at the right time. But for some purposes the sets are still desirable. If the onions are wanted for use when small and green, and are wanted as early as possible, it is best to plant sets in the fall. But if good crops

of ripe onions are wanted, then it is best to sow the seed. There are two methods of doing this. One, the so-called new onion culture, is to sow the seed in a greenhouse or frame, and transplant them to the open ground as soon as about the size of a small lead pencil. This can be done faster than the rows sown in the open ground can be thinned. The usual plan, on the other hand, is to prepare the land as early as possible, and sow the seed in rows 15 or 16 inches apart, about the middle of February, and thin to 3 inches between plants. A mellow, sandy soil is best for onions, or a moist black soil. For green onions to use in early spring the best sets are those of the Pearl or the Queen. Onions need a rich soil, and no good crop can be expected without heavy fertilization.

We have said that it is best to plant sets in the fall. If we were sure of good growing weather at this time it would be as well to sow the seeds early in September. But we are so apt to have dry weather at this time that the seeds will fail to get size enough to carry the plants safely through the winter. But we can sow the seeds thickly in a well-prepared cold frame in January and carry the plants through till late February, when they can be hardened off and set out in the open ground, and be little if any later than the sets planted in the fall.

When sets are planted in the fall, the ground should be well prepared and rows run out so that the furrows can be well fertilized and the soil bedded over the rows (about 16 inches apart) in slight ridges above the general surface. The top of the ridge is then flattened somewhat and furrows made in them so that the sets can be planted rather deeply in the beds, and well covered. This will place them a little above the general surface and yet have them deep enough to be protected from the cold. When the bulbs begin to form, the earth should be scraped away from the bulbs so that they will form on the surface, which could not be so well done if they were planted in furrows on the level ground. The ridges also protect from excess of wet in winter. We plant the sets but a couple of inches apart, and begin thinning for use in early spring, so that the last have four inches.

For fall planting there is no better sort than the Pearl, which seems to be an improvement in size over the Queen. For sowing in the spring, if the seeds are sown under glass and transplanted, the Priz-taker is the best for a ripe crop. But they will not keep well, and must be used or sold early. For the general crop to be sown in the open ground in February, we have found none better than the Southport White Globe, either for family use or for market. The Giant Rocca, White Pompeii, and others of the Italian class, are rapid growers and fine croppers, but none of them will keep well for winter use. For a good keeping red onion, the best we have tried is the New Opal. It is the most solid and best keeping onion we have ever grown. The Bermuda onions, white and pink, are early ones, but must be used at once, as they will not keep.

Constant and clean, but shallow culture is what the onion requires. The plant will not tolerate any weeds, and it has grown into a proverb that the cultivation must be "as clean as an onion bed."

Parsley.

Parsley is used in all well-regulated households, but the quantity needed is not usually large, and but little room is required for it. For winter use we sow in the cold frames in September, and it can be had in good shape all through the winter. Another sowing should be made in March in the open ground to take the place of this in the frames, which will run to seed as soon as the weather gets warm, and we usually pull it out of the way when we want the frames for the tomato plants. The Double or Miss Cured is the only variety to sow. Sow quite thickly in rows 8 or 10 inches apart.

Parsnip.

The Parsnip is not as much grown in the South as it should be. It is of no value to our market gardeners for shipping North since it is a winter vegetable that can be as well grown there as here, or better, and it is only occasionally in very hard winters, when the ground is too hard frozen North to get the roots out, that a price sufficient to pay for shipping could be had. But for home use from Christmas to February, when they will begin to grow again with us, the parsnip will prove a most acceptable vegetable on our tables.

The main trouble has been that we have followed too closely the practice in northern gardens with this and with the salsify, and have sown the parsnip too early in the spring. The result is that the plants get stunted at midsummer, and some of them will run to seed and spoil the roots. Parsnips should be sown here after some early crop like peas has come off. If the soil needs any further manuring do not use stable manure, as it will tend to make the roots forked, but sow some good complete fertilizer in the furrows (about 18 inches apart) and bed on that, and then flatten down the ridges and sow the seed. Parsnip seed are light and cannot push through a heavy cover. They cannot be sown with any regularity by any of the garden seed drills that we have tried. The best plan for small gardens is to drop a small pinch of seed in a place about four inches apart in the furrow, and thin them, when strong enough, to one plant in a place. It is much easier to thin out these bunches than a continuous row. We practice the same plan with beets, carrots, and salsify. Any time in May is early enough for the sowing, and they may be sown up to the last of June. Being perfectly hardy, there is no need to lift the roots in winter, but dig them as needed for the table. They get their full flavor only after frost has checked their growth, and when they begin to grow again they rapidly lose sweetness. They are cooked by stewing or by slicing and frying. The best variety is the Hollow Crowned.

Peas.

By peas we do not mean our southern field or cowpeas, but the English pea. The name pea as applied to our southern peas is a misnomer, for they are not peas at all, but beans.

EARLY VARIETIES.—The pea is of universal use as a table vegetable, and is among the most important of the early crops grown by our market gardeners for the northern markets. But the truckers do not grow the varieties we want in our home gardens. They grow the sorts that are the earliest and which give their whole crop at once, while we in the home garden want better flavored sorts, as early as we can get them, and we want sorts that will continue longer in bearing. Fortunately we now have varieties of high quality that are almost as early as the extra early and flavorless little ones used by the truckers for early shipment.

Peas do not need heavy applications of nitrogenous manures, and our garden soils that have been manured for years are generally rich enough for them without special manuring. We have found that a top dressing of land plaster while in the young growth is of great advantage to them, as it is to beans and other leguminous crops.

The old practice in gardens was to sow the peas in double rows about 6 inches apart, and place a row of brush along between the rows for the peas to climb on. But we have found it best to sow in single rows three to four feet apart, according to the height of the variety, and to provide the galvanized wire netting attached to stakes for them to run on. This wire netting can be had from one foot wide, which will do for the more dwarf sorts, to any width for the taller ones and the climbing beans. While some follow the practice of the truckers, and let the dwarf sorts tumble as they please on the ground, we have found it always better and neater to furnish some support. The galvanized wire netting can be had so cheap that even a farmer cannot afford to cut brush out of the woods if his time is worth anything. If rolled up and put away at the close of the season the netting will last twenty years or more.

In planting the earliest sorts, we simply sow them thickly along the furrows and cover deeply. Four to six inches of cover will make the plants last longer in dry weather. As hot weather comes so soon here, we usually make but one sowing of peas in spring, but we make a succession by sowing at the same time several varieties, which come into use in succession, so as to prolong the season somewhat. The tall Marrofats sown in early December or in November will follow after the earliest peas sown in January or February. We make one general sowing in February, using several sorts, from the earliest to the latest, and by the time they are all gone we have so many other vegetables that we do not greatly miss the peas. The wire netting can be about 3 feet wide.

For the earliest we use the Alpha, which is a wrinkled pea of fine quality, and almost as early as the little extra early pea which the truckers use, and vastly better. To follow this we plant at same

time the Premium Gem, a fine dwarf sort, Horsford's Market Garden, Yorkshire Hero and the Blue Imperial. There is a little dwarf sort called the American Wonder which has the merit of earliness, but it is so very dwarfed that it is of little use for cropping. The Blackeye Marrowfat is the kind usually sown by truckers in the late fall for the late crop, and it is worth growing in the private garden, but takes a good support as it is a tall pea. The Champion of England is a pea of the finest quality, which is also a very tall grower, but it has been so unproductive here that we do not grow it any longer. Those we have named above will usually suffice for most families. A variety of same height and season as the Premium Gem, called the Chelsea, promises to supersede the Gem, as it is more productive.

LATE FALL VARIETIES—Most of our private gardeners content themselves with the early spring crop of English peas, but the fall crop is fully as certain and as easily grown. Northward the fall crop is very uncertain on account of mildew, but we have never had a pea to mildew here. In fact, mildew of all sorts seems less prevalent in the South than northward. For the fall crop we use land where some early crop has been removed, and sow Yorkshire Hero about the middle of August or a little earlier, and Premium Gem up to the first of September. The seed should be sown in deep furrows, and covered but lightly, the earth being pulled to them as they grow till level, so as to get the roots deep in the ground to resist the autumn drought. These will bear till hard frosts. The furrows should be $3\frac{1}{2}$ feet apart for the tall late kinds, and 2 feet for the bush sorts.

Peppers.

Peppers are started under glass, and afterwards grown in the same manner as the Egg Plant. The large sorts that are used for stuffing and pickling need a little more room than the more dwarf sorts, and should be set three feet apart in strong land. The old Bull Nose is as good as any for this purpose. For seasoning purposes a plant or two of the Red Cluster will be sufficient to supply a large family with pepper-sauce.

Potatoes (Irish).

The early potato crop is one of the most important to our eastern market gardeners, who produce this crop in the highest perfection. But in private gardens, where it is sometimes desirable to have a few for early use, the crop is seldom encouraging. This want of success with the Irish potato among private gardeners is due, we think, to two causes. The home gardener manures his soil every year with stable manure, and in this way gets in the land an excess of nitrogenous matter. The result is that he gets a great growth of vines and but few and small tubers. He has not enough phosphoric acid and potash to balance the nitrogen, and potash is essential to

the formation of starch in the plant, of which the potato so largely consists. Then, too, the presence of the stable manure encourages the growth of the scab fungus, which spoils the appearance of the crop. We never use a fresh application of stable manure on land to be planted in Irish potatoes. On the farm the potato should not occupy the home garden, but should have a place among the field crops. There is no doubt that the culture of the potato at different seasons can be made a profitable crop in almost all parts of the state, particularly in the mountain country. Therefore in treating of its culture we will not confine our remarks entirely to the garden culture of the crop.

The second reason why our home gardeners so often fail with the early crop of potatoes is that they so persistently select the northern seed potatoes for planting. Our truckers in the eastern part of the state are wiser, for they will not plant the northern seed if the home-grown second-crop seed can be had. But in sections out of the trucking region our people still think that they must have northern seed. The dealers in Raleigh and other towns of course cater to the demand and sell only the northern seed, but if private gardeners could only be convinced that the second crop seed from the eastern part of the state will give them better results and demand them, the dealers will soon supply them.

The difference is that the potatoes from the North are so long out of the ground that they get to sprouting in the cellar before they are shipped South. These sprouts are rubbed off, and by the time we get them they are starting other sprouts from lateral eyes, all of which are using up the store of food for the plant, and when planted they throw up a bunch of shoots instead of the strong terminal shoot from an unsprouted potato. The second crop, grown in the South in the fall from seed of the early crop of the same season, are dug in December, and are out of the ground so short a time before we plant the early crop that they do not begin to sprout till planted, and indeed can be kept unsprouted in the cellar till June. They grow with the strong growth of the terminal bud, and have an unexhausted store of food to draw upon. The result is a stronger growth and better crop. If our readers have not grown the second crop for themselves, we advise them to send to the dealers in Newbern, Kinston, Goldsboro, etc., and get the second-crop seed potatoes rather than to use the northern seed.

Potatoes are one of the first crops to go in the open ground in the spring. From Raleigh eastward they should be planted by the end of February, if possible to get the land dry enough. In the sandy sections they can be planted any time in February, and anywhere east of the Blue Ridge in early March. On the high mountain plateaus the crop should go in the ground in April.

As we have remarked, the potato requires large supplies of potash. A good potato fertilizer should have at least ten per cent. of actual potash. Few of the mixtures sold have this much. It is therefore

better to make our own mixture. Wool ashes, while a good source of potash, are thought by good authorities to encourage the scab fungus, and are therefore avoided. The best form in which to get the potash needed by this crop is the muriate or sulphate of potash. We would suggest as a good formula for garden use for the potato the following to make a ton:

Nitrate of soda -----	200 lbs.
Cotton seed meal-----	500 lbs.
Acid phosphate-----	900 lbs.
Muriate of potash -----	400 lbs.

This can be used as liberally as necessary to the fertility of the land. Our eastern truckers use a ton per acre of a similar mixture with profit, and if our farmers wish to make large crops of potatoes they must be liberal with the fertilizers. The fertilizer is to be scattered along the furrows, which should be, for horse culture, about two and a half feet apart. Bed furrows on this, and then with a small plow open the beds for planting.

For planting, the potatoes should be cut to two or three eyes, and dropped about 12 to 15 inches in the furrow. If there is any scab in the seed, it will be a good practice to roll the cut pieces in flowers of sulphur. It has been recommended to soak them for an hour or so in a solution of corrosive sublimate ($1\frac{1}{2}$ ounces to 10 gallons), and this seems to be effective. But experiments have shown that the sulphur treatment is as effective, and the sublimate is such a poison that we prefer ordinarily not to recommend its use.

Cover the potatoes by lapping two furrows over them, leaving a sharp ridge. The first working just before they come up will be harrowing down the ridges and making the surface level. This will destroy the young grass just starting. As soon as the plants can be seen along the rows, go over them crosswise with a light smoothing harrow, the teeth of which slant backwards. This will be better than any hoeing that you can give, and is much more expeditious. The subsequent culture should be with a cultivator, and finish with one plowing, throwing a furrow to the rows, and clean out the middies with a sweep. Where potatoes are grown on a large scale, a digging machine saves much labor. The one commonly used by the Newbern truckers is called the "Boss," and is said to do very good work. There are several planting machines patented, but the experience of our largest truckers is that the negro with a mule and a one horse plow can beat any potato planter yet invented. One of the largest Newbern growers told me that he has several planters for sale cheap to any one who wishes to try them.

LATE POTATOES FOR TABLE USE.—Our markets in all the southern cities are still supplied mainly in the winter with northern potatoes. This should not be, for it is perfectly practicable to grow good late potatoes anywhere in the state. Particularly is this true of the high plateau region west of the Blue Ridge, where the finest of potatoes

can be grown in the same manner that they are grown North, if they will simply abandon the practice of growing only the early sorts. In that region the later sorts, like the Rural New Yorker No. 2, can be planted at the usual time and harvested late enough to keep well. East of the Blue Ridge, the best plan to get a late crop for table use (and this crop is entirely distinct from the second crop for seed, of which we will yet speak), will be to get from the eastern part of the state, in the spring, seed of the preceding year's second crop. Keep them in a dark cellar till they show signs of sprouting, and then remove them to full light and spread them out in the light, so that the sprouts will keep short, stout and green. The best place to plant them is a piece of land from which a crop of clover hay has been cut. Plow the stubble as soon as the hay has been cut, burying the sod deeply. Prepare the surface well and mark out the furrows as for the early crop. For this crop make a mixture of 1,600 lbs. of acid phosphate to 400 lbs. of muriate of potash to make a ton, and use fully 500 lbs. per acre in the furrows, well mixed with the soil.

Plant the potatoes in July, as early in the month as possible. All subsequent cultivation should be perfectly level. The object at this season is to conserve the moisture in the land, while we hill early potatoes to keep the land warm. The Early Rose or the Peerless is good for this crop.

THE SECOND CROP FOR SEED FOR THE NEXT YEAR.—This is one of the most important crops to the southern market gardener, for they are not only best for his own planting, but the merits of these second crop seed are becoming recognized in the North, and there is a growing demand for them for northern planting. This crop is grown from the early crop. As soon as the early crop is mature, the potatoes are taken up, and a small piece is cut from each so as just to break the skin. We find that those cut in this way are more certain to start to grow in time than if they are planted uncut. After cutting, we spread them in any convenient place and cover them deeply with pine straw or leaves. They are allowed to remain here in a single layer till they show signs of sprouting. Then they are planted without any more cutting. In planting we run very deep furrows, and drop the potatoes, but cover them very lightly with rakes. We then send a man to tramp on them to pack the soil to them. Plant none that are not sprouting if you want an even stand. As they grow, the soil is worked to them till level, and the cultivation is perfectly level. We plant as they sprout till the middle of August. This crop will grow green till the frost cuts the tops down, and are then dug. Being an immature crop, they keep better than any that get perfectly ripe, and make the best of seed for the following spring and summer planting.

For the early crop there are a number of varieties recommended, but our market gardeners stick mainly to the Houlto Early Rose. Bliss' Triumph is largely grown, and is early and productive. Its

red skin is somewhat against it, but there is a sport from it which has a white skin that is getting popular in the eastern part of the state. For the main crop in the mountain country, we recommend Rural New Yorker No. 2, Burbank, Peerless, Rochester, and Late Beauty of Hebron. The Early Beauty of Hebron is also a fine early sort. The varieties of potatoes are almost without number.

KEEPING IRISH POTATOES.—It is perfectly useless to attempt to keep on a large scale the early potatoes grown in the South, and they should be used as soon as dug. A plan, however, for saving the first crop on a small scale, as recommended to us, is the following.

The first crop may be preserved until freezing weather sets in if the following directions are faithfully carried out:

Do the potatoes before sunrise, and put them under a bough that is two or three feet above ground with good ventilation under it. Do not put them in heaps, but place them carefully by hand so as not to touch each other. Let them rest on the ground. Do not put away those that are cut or bruised or diseased with scab. If there is good ventilation, and the ground under the house is dry, there will be no trouble until the weather gets cold enough for a freeze. If potatoes are exposed to the summer sun for even a short time before being put away they are very apt to rot. It is not practicable to preserve large quantities of potatoes in this way, but where the requisite conditions exist, enough for the use of an ordinary family may be kept until cold weather.

The second crop grown from the first crop can be kept better than any potato grown North. The place to keep them is in a heap in the open ground, covered with pine straw and earth. If kept in a cellar it is hard to keep it cool enough. The Irish potato should be kept in winter at a temperature not over 40 to 45 degrees, and this is hard to do in a cellar here. So we prefer to keep them in hills. If placed in an outhouse, and covered with pine straw on cold nights, and never allowed to have a ray of light on them, they will keep well, and are easier to keep cool than in a cellar.

When Irish potatoes are first put into a cellar in fall, they will go through a slight heating, and there will be a few decayed ones. A week or ten days after they are stored they should be sorted over and all damaged specimens taken out. Then in re-storing them, sprinkle air-slacked lime liberally through the whole pile, and this will usually prevent further decay, if the potatoes are kept dark and at a sufficiently low temperature—35 to 40 degrees, or not above 45 degrees, is best for Irish potatoes in winter. Warmer than this, they will be apt to sprout.

Potatoes (Sweet).

Sweet Potatoes in the South are more a crop of the farm than the garden. Town gardens are usually too rich in nitrogenous matter to grow good crops of sweet potatoes. It is an error, however, to suppose that poor soil is necessary for the crop. Good sweet potatoes can be grown on our richest garden soils if plentifully supplied

with phosphoric acid and potash. It is the excess of nitrogen in proportion to these constituents that makes the plants run to vines and make small roots. The tuberous roots of the sweet potato are the reservoirs in which the plant stores the surplus starch and sugar for the future use of the plant. Potash is essential to starch formation, and if there is only enough potash in the soil to enable the plant to make the starch needed to build up its structure, there will be no surplus, and hence no large potatoes. A light soil is necessary for the best success with the sweet potato. They will grow on heavy land, but the crop will be of inferior quality.

To get plants for setting for the early crop, we bed the small potatoes in sandy soil in a cold frame, placing them in a single layer and covering with an inch or two of the same sandy soil. The sashes are then put on and the frames kept close till the potatoes begin to sprout. After this, close attention must be given to airing the frame when the sun is shining, and watering them with tepid water as needed. This plan is far better than bedding in a manure-heated hot-bed. In the frame we seldom have the Black-shank fungus to any extent, while in a hot-bed the plants are sometimes swept off by it. The bedding should be done the last of March, or even as early as the middle of the month. Nothing is gained by being too early, for the plants should not go into the open ground till May, or until the soil is well warm. Too early planting makes no advance in the earliness of the crop as the plants get stunted, and are outstripped by those set later in warm soil.

The best dressing for land that is to be planted in sweet potatoes is a broadcast coat of rotten leaves from a pine woods. Rake up the leaves and spread them thickly all over the ground and plow them under shallow. Sweet potatoes are one crop which needs shallow plowing, for we want a firm bottom for the tubers to form against, and to keep them from being long and stringy, a short, chunky potato being better for use or for market. The more trashy the land is with the piney wood litter the better, so long as it is not too trashy to get the plants to live well. Run out shallow furrows and scatter in them about 300 lbs. per acre of a mixture of 1,000 lbs. of acid phosphate, 600 lbs. of cotton seed meal, and 400 lbs. of sulphate of potash, (high grade, 50 per cent. of actual potash). The muriate of potash and kainit on sweet potatoes affect the quantity of sugar, and for this reason for the sweeter varieties, sulphate of potash is to be preferred. The above mixture will make a ton, but smaller quantities can be mixed for the garden if necessary. If you are planting sweet potatoes in an old garden which has been highly manured for years, use only acid phosphate and sulphate of potash mixed—three parts of acid phosphate to one part of sulphate of potash—and you will be likely to get good potatoes on very rich soil.

To set the plants we bed on the furrows containing the fertilizer, by throwing a furrow from each side with a small turning plow. The top of the ridge is chopped off and the plants are set 15 inches

apart in the ridge, the ridges being three feet apart. In drawing the plants from the bed we place them at once in buckets of water. The soil at planting should not be wet, but merely in good working condition. The plants being set dripping with water will puddle their own root's sufficiently, and no watering will be needed. Set the plants so that only the tip is above the surface. Cultivation should be done with a cultivator, running close to the rows, and one hoeing. Finish with a cotton sweep, which will put soil enough to the rows. The practice, still common in some places, of pulling up high hills, is not only unnecessary, but is harmful, as it encourages the potatoes to grow long and crooked. A shallow ridge, as for an ordinary cotton row, and a firm bottom below will give the best crop of short and plump roots.

The late crop for winter keeping, and for seed for the next year, is grown from cuttings of the vines of the first planting, set in July. For seed purposes the cuttings should not be set till August, so that the roots will be of small size. A small-sized sweet potato will always make a larger crop than a large one, as they give more plants to the square foot of bed. But for table use in winter, set the cuttings in July. Prepare the land as for the first crop, and run out the furrows and mix the fertilizer well with the soil in the furrow. Make cuttings of the tips of the vines about two feet long. Lay them along the furrow, with the cut ends in the furrow and the tops in a row along the earth thrown out from the furrow, and about 12 to 15 inches apart. Now turn another furrow on them, and let a man walk along on this furrow-slice to press the soil to them. If done when the soil is moist, nearly every one will grow. This method is the most rapid we know of. In small gardens, the cuttings may be set with a garden trowel, and the soil packed to them by hand.

VARIETIES OF SWEET POTATOES.—The southern people do not like the dry and choky potatoes that are popular at the North. They like the soft and sugary yams. One potato of recent introduction, known as the vineless yam, seems to be a compromise between the two, and to our taste is about the best of sweet potatoes. It is fully as handsome as the yellow potatoes grown for the northern markets, and has a soft texture that will recommend it to the southern palate. The popular potato here is what is known popularly as the "Bay-dus," a corruption of Barbadoes. There are two varieties, the yellow and white fleshed. Both are fine potatoes, but are very hard to get pure, as most of the stocks are badly mixed. Southern Queen or Hayman is a productive sort, and has improved greatly in quality since its introduction. For the home garden we should plant none but the Vineless, as its bush habit makes it better for small grounds, and it will do better in rich soil than most of the other sorts.

KEEPING SWEET POTATOES.—Sweet potatoes can be dug for table use as soon as large enough to eat, but they do not attain their full

sweetness till after they are fully ripe and have been stored for some time. This is particularly true of our southern yams, which do not get their full sweetness till in the winter. The potatoes grown from the early spring plants should be used during the fall, as they do not keep so well in winter as the ones grown from cuttings. The main crop for winter use should remain till the frost has nipped the vines. As soon as this occurs the vines must at once be removed, or they will generate a rot that will affect the roots. Dig the potatoes on a dry, warm day, and handle them as gently as eggs. Do not put any that get cut or bruised in the pile that are to be stored for winter. If a dry cellar is at hand, they can be stored there, piled on a thick layer of pine-straw and covered with the same. Otherwise, store them under an open shed. First put down a thick layer of pine straw, perfectly dry. On this pile the potatoes in a conical heap, not more than 20 bushels in a pile. Handle them at all times with great care, so as not to bruise them. Cover the piles thickly with dry pine straw, and let them remain to sweat for some time. As the weather grows colder, cover the heaps with a thick layer of dry earth. The shelter above will keep the earth dry, and the dry earth will keep out a great deal more cold than if there was no shelter above. We have kept them in perfect condition in this way till June. For large crops it will be better to make a regular potato house, with walls having a dead air space and ventilators above. In this, the potatoes can be stored in crates, piled so that the air can circulate among them. A furnace and a flue running through the house should be provided to ward off unusual cold, for it is necessary to keep them at a temperature that will never go below 50 degrees. In such a house, if the potatoes are dried off when first put in at a temperature of nearly 100 degrees for a day or so, the after-keeping will be in a great measure ensured. While thus kiln-drying them, the ventilators should be kept open. But do not kiln-dry any potatoes that are to be used for seed purposes.

Radishes.

Radishes are among the earliest of spring vegetables, and are so quickly and easily grown that few families are without a few in the early spring. But there are few gardens in which the supply is kept up at the season when other vegetables are most scarce, in the winter. And yet in this climate there is nothing more easy than to have a supply of vegetables of the radish family from early fall to late spring. The radish is one of the vegetables which the possession of a cold frame makes easy to grow all through the winter. We are writing this in the middle of February, and in our home garden we have had radishes to eat since the last week in January from the cold frame, merely from the little trouble of sowing the seeds in the frame and keeping it protected at night and in frosty weather by the glass sashes. Rows should be 10 inches apart, and the seed sown thickly in the row and thinned out. We begin to

sow radishes with the Rose Colored Chines in September in the open ground, and by the time these are getting tasteless the little French Breakfast Radish is ready in the frames, and a second sowing of these is made in February in any vacant space that we get in the frame by using the lettuce. The first sowing in the frames is made any time in December and up to January. Then we make our first sowing in the open ground early in March, using at that time the Long Scarlet Short Top. This brings us as late as we want radishes. Of course, the soil in the frames is kept as rich as it can be made, for the crispness and flavor of a radish depends upon the rapidity with which it is grown. We always sow in rows, even in the frame, so that they can be cultivated. The first sowing in the open ground is usually made in the same row with our early beets. The radishes come up quickly and mark the rows, and to some extent protect the beets from the frost, and are all pulled out by the time the beets want all the room. In small town gardens this economy of space is an important matter.

Rhubarb, or Pie Plant.

This is a vegetable rarely seen in southern gardens. Why this is so it is hard to say, for there is nothing that is more acceptable in early spring for stewing to take the place of the dried fruits of winter, as a sort of acid fruit dish, or for the making of pies and tarts. Rhubarb needs a deep and very fertile soil, and it is useless to expect to grow it in a thin, dry soil. Not that it needs a wet soil by any means, but a soil retentive of moisture and rather inclined to clay; though good rhubarb can be grown in quite a sandy soil if it be well manured. No amount of fertilizer we have ever tried will take the place of stable manure with this plant. The organic matter in the manure making the soil more retentive of moisture, makes it indispensable when large and succulent stalks are desired. As it is only the leaf stalks that are eaten, the quality depends upon the size and succulence which these are made to attain.

Rhubarb is commonly grown by the division of the roots, care being taken that each piece has a good bud. The roots can be bought from nurserymen or grown from seed. The seed should be sown in beds 8 or 10 inches apart in the open ground in early spring, and kept carefully cultivated during the summer. They can be transplanted, after top has died down any time before Christmas, in the fall to their permanent quarters, or given more room for another year's growth before the final transplanting. The plants should be 3 feet apart each way. Myatt's Linnaeus is the finest, while Victoria is the largest stalk, but coarser and not so tender as the other.

Salsify, or Oyster Plant.

This is one of the hardy winter vegetables that is not cultivated as commonly in the South as it should be. This has been largely

caused by ignorance of the proper treatment of the plant. The books on gardening, being mainly written by northern men, have naturally give directions for culture that suited the climate to which they have been accustomed. We are told to sow the seed of salsify and parsnips in the earliest spring, as soon as the land is dry enough to work. This may do in the shorter season at the North, but from Virginia southward it is doubtless a mistake to sow the seeds of either of these vegetables early in the spring, for there is certain to come a time about midsummer when their growth is checked, and if they do not run to seed the roots become tough and stringy. In this latitude and climate the middle of July is early enough for the salsify. At this time we usually have plenty of rain, and the plants grow off without any check. At best they do not grow fast till the cool weather of autumn comes, and here, with slight intermission in the coldest weather, will grow all winter. The old variety of salsify has been entirely superseded by the kind called Sandwich Island. The seed should be sown in rows about 16 inches apart, quite thickly, and then thinned to about two inches in the rows, for this will give all the room needed by the slim roots.

Spinach.

While Spinach is grown very largely by our market gardeners in the eastern part of the state, it is seldom seen in the home gardens. Here the reliance for winter and spring greens is entirely upon the coarse Collard and the tops of turnips. With an abundance of spinach the winter garden is helped wonderfully. The cultivation is of the simplest kind. We make the first sowing about the last of August, and another about the middle of September. The seed are sown quite thickly in rows about 16 inches apart and never thinned, as this is done in cutting the crop in winter. The best kind to sow is the Norfolk Savoy Leaved. A spring sowing may be made also, if done very early in February or March, but it lasts a very short time, running to seed with the first hot weather. Light, warm soil and heavy manuring are needed for a good spinach crop. On the approach of winter it is well to mulch the ground between the rows with rough manure, for the plant, though perfectly hardy, will grow better for the keeping of the frost out of the ground. There is another plant known as New Zealand Spinach, but of entirely different botanical relationship. This is grown only in hot weather. The seeds are sown in the spring, and the plants transplanted to hills fully four feet apart. They will cover the entire space. The leaves are used as the common spinach, but coming at a time when there is usually an abundance of garden vegetables, this plant has never become popular.

Squashes.

The only squashes worthy of growing in a southern garden, are the early summer bush sorts. The winter squashes, so popular at the

North, are of little use here and are not needed, as our sweet potatoes fill the place they occupy North far better than the squash does at the North. In a climate where we can grow the sweet potato, and keep them for ten months in the year, there is no need for the winter squash, as every dish that can be made from the squash can be made better from the sweet potato. Summer squashes occupy a different place, and are acceptable. Their culture is as simple as that of the cucumber, and the enemies to be guarded against are the same. We prefer to place a shovelful of rich compost in the hills and make them four to five feet apart. Put in plenty of seed, so that if the bugs destroy any before you get some bone-dust scattered over them, you will have enough left. Two plants in a hill are sufficient, and if four feet apart each way, for bush varieties, one plant is enough. For running sorts, plant five feet each way. We grow the White-bush Pattypan and the Yellow Summer Crookneck, both bush varieties. The Marblehead is a good winter squash.

Tomatoes.

This is one of the most important crops of the home garden, and one that the gardener always takes pride in having early and late. There is much more difficulty in keeping up a regular supply of tomatoes during the summer in this latitude than further north, and it is necessary to keep up a constant succession by repeated sowings. For the earliest crop the seeds should be sown in boxes in late January. If there is a greenhouse, this is of course the place for the start; but if not, then boxes can be placed in a sunny window of a well-warmed room. We use little boxes three inches deep. These can be made by cutting soap boxes or starch boxes into two flats. Fill with light rich soil and sow the seeds thickly. As soon as they are large enough to handle, transplant into other boxes, or into small flower pots, and keep moderately warm and close to the light so that they will not draw up tall. If inclined to do so, pinch out the top bud and let them branch. By the latter part of February they can be set four inches apart in the cold frames and covered with the glass. When in the cold frames, the plants should have all the air possible in sunny weather and be closed at night, and in dull cold days. The effort must be to gradually harden them to the outer air and keep them short and stout. They can be lifted for the final transplanting (which should be in rows 4 feet apart, and the plants set 3 feet apart) to the open ground with a mass of earth that will ensure their living. This final transplanting should be done as soon as there is a fair chance of their escaping frost. Here this can be done the middle of April, and in the more elevated parts of the state early in May. The earlier they can be set out and live, the earlier the fruit will be ripe. We have had ripe tomatoes in our garden here in Raleigh the last week in May by this treatment. If a light frost is in prospect after they have been set out, we go over the plants and bend them carefully to the earth and cover them with a

shovelful or two of the mellow soil. This will keep them secure, and they can be uncovered when the cold has passed. In the warm March of 1891 we set our early plants out the 17th of the month. On the morning of the 26th, we had the mercury down to 21 degrees above zero, but we lost none of our plants. Being warned by the weather bureau that frost was coming, we bent the plants down the evening before and placed a wisp of hay over each plant, and mounded the soil over all. There they remained for two days, and when uncovered were all right, and we had the first tomatoes in the neighborhood.

For a succession crop, seed should be sown for plants late in May in the open ground, and again the latter part of June. Plant thickly and thin out 2 or 3 inches apart, to be transplanted as for the early crop. This last sowing will in some seasons give ripe fruit in September and October, but we sow it mainly to get an abundance of well-grown green tomatoes just as the killing frost comes. We take these tomatoes as soon as the frost touches the plants, and wrap each fruit in paper and pack them in a box and place in a cool place in the house, where they will not freeze. A few are taken out from time to time and put in a warm place where they soon ripen. We thus keep up the supply of tomatoes for slicing till the middle of January.

VARIETIES OF TOMATOES—The varieties of tomatoes offered in the seed catalogues are now so numerous that an amateur is sometimes puzzled as to which to select. We do not propose here to give a catalogue list, but to suggest a few that will give all the variety needed. For the earliest, we have found none that can excel the Early Ruby, but we do not want many of them as they are irregular in shape and of inferior quality, but a few are desirable to start the season. For a stand-by in tomatoes we have found none better than Livingston's Beauty. Crimson Cushion is good, and for those who fancy a monstrosity in size, the Ponderosa is a good one. But it is rough and ripens badly around the stem. In quality for slicing raw, it is hard to beat. But it is a short cropper, and does not last long enough. For a yellow tomato the Lemon Blush is the best we have ever tried. The pear and plum shaped tomatoes are useful for pickling, and are more resistant to the influence of the Southern Blight than the large ones. If we could get a large tomato with the productive character and robustness of the pear-shaped tomato we would desire nothing further.

SOUTHERN TOMATO BLIGHT.—This disease attacks not only the tomato, but the Irish potato and the watermelon. It is caused by minute organisms or bacteria that infest the tissues of the plant, and finally show their effect in what seems to be a sudden collapse of the whole plant. It is the great drawback to the cultivation of tomatoes here. Some have recommended the liming of the land before the crop, but this has not been proved effective. We propose the coming season to try the effect of an application of sulphur on the land, or possibly some other plan, and hope to find some preventive.

Turnips.

The turnip as a rule has no place in the home garden. Its place is in the field. But there are early-maturing sorts that can well be grown in small quantities in the garden. The Extra Early Milan matures almost as quickly as a radish, and should be sown merely for table use as it soon becomes pithy and worthless. But in the young state it is a very sweet and desirable turnip. It can be sown later than any other. We have made a good crop sown as late as the last week in September. In fact turnips in this climate are usually sown too early. As an experiment we once sowed 16 varieties of turnips the third week in September, and made a fair crop from all, and they wintered even better than those sown earlier. For any turnip except the Rutabaga class we think that the first of September is early enough. Turnips should always be sown thickly in rows 2 feet apart and cultivated, and not sown broadcast, as some do. They should be thinned out to 4 inches apart in order to ensure a good stand. We can usually get better crops of variety turnips on soil of only moderate fertility heavily manured than from rich soil with less manure. They seem inclined to run more to tops in the old-manured soil.

Pests of Vegetable Crops and Their Treatment.

BY GERALD McCARTHY, BOTANIST AND ENTOMOLOGIST.

Introductory.

All our cultivated vegetable crops are more or less subject to destructive insect and fungus parasites, and each new year sees additions to the already large number of pests of the garden. Formerly when methods of transportation were less perfect, each locality usually had only its native pests to deal with, and these always had their own enemies which served to hold them in reasonable subjection. But, unfortunately, commerce has brought us, with other things, the pests of all countries having a climate similar to ours, and these new pests, having left their natural enemies behind them, are here able to increase with alarming rapidity unless checked by devices of human invention. This is the reason why old-time methods of gardening are in some cases no longer successful. On the following pages we have given formulas for preparing the more successful and proper remedies for the pests mentioned under the several heads. Formulas 1 to 4 are fungicides, for use against fungus parasites only. The remainder, except the last two, are insecticides only. In many cases we can combine a fungicide with an insecticide, such as Nos. 4 and 7. But in dealing with vegetables which are to be used for food, often in an immature state, the use of arsenic in any form is dangerous. But upon the Irish potato, and all vegetables of which the root or the below-ground part only is eaten, there is no harm in the use of arsenites. The use of these, indeed, is the only way of successfully combatting the Irish potato beetles. No fear need be entertained that the other formulas (*i. e.*, all except Nos. 7 and 8) are poisonous or hurtful in the quantities indicated. We prefer for use in the vegetable garden formula No. 1. It contains the least quantity of copper sulphate, is easy to prepare and to apply, and does not spot or discolor the vegetables.

Apparatus for Applying the Remedies.

We give below a few cuts of apparatus suitable for applying the different formulas given in this bulletin. Fig. 1 represents the knapsack sprayer, which is the most convenient form for gardens of

$\frac{1}{4}$ acre or more. There are various makes on the market at from \$10.00 to \$14.00. The material of such a sprayer should be brass and

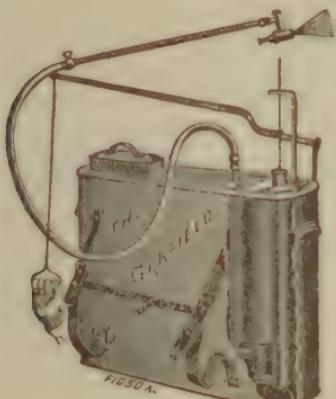


Fig. 1.—Knapsack Sprayer.



Fig. 2.—Bucket sprayer.



Fig. 3.—Powder-bellows.

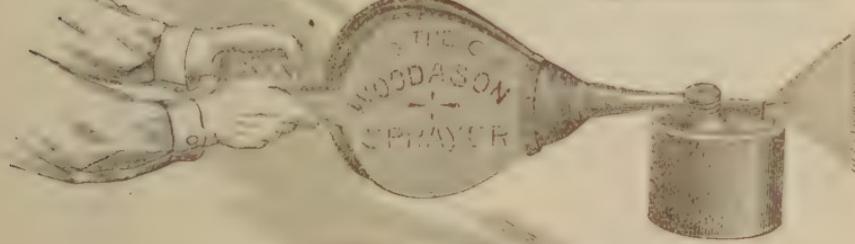


Fig. 4.—Atomizer for liquids.

Excelsior Powder Duster or Dry Sprayer

copper only—no iron or tin. Fig. 2 shows a useful and efficient sprayer for small gardens. The pump and hose without bucket is sold for \$4.00. Fig. 3 shows a powder-bellows for applying dry powders, such as formulas 8 and 9. This is, however, very tiresome to the arms. It costs \$3.00. Fig. 4 shows a small atomizer for applying clear liquids, and can be used for formulas 1, 2, 5 and 6. It is too small except for a few plants. The cost is \$1.50. Fig. 5 is a form of powder gun which works by a



Fig. 5.—Powder gun.

rotary fan and gives very good satisfaction for fine dry powders. It costs about \$5.00. It is largely used by cotton growers.

For applying powders, a can or a long-handled sauce-pan, with the bottom finely perforated, will give very good results, and is all that is needed for a home garden. For liquids in the home garden we recommend especially Fig. 2. But an ordinary galvanized iron or copper watering can with a fine rose will do. The copper liquids would soon destroy ordinary tin vessels, unless carefully washed after the application is finished.

Finally, we must emphasize the fact that all these remedies, as regards fungous parasites, are preventive—not curative. No diseased leaf or stem can be made healthy again. Therefore the remedies must be applied before the disease becomes bad, or they will do little good. Cleanliness in the garden is of very great importance. Gather up and burn all diseased vines, roots and trash, as these, if left alone, will harbor the parasites and carry them to new crops. When you spray or powder the plants do *thorough* work, and put the remedy on the side of the leaves where the parasites are found.

Formulas.

NO. 1.—AMMONIACAL COPPER CARBONATE.

Copper carbonate	1 ounce.
Strongest ammonia water (26° Beaumé) sufficient to make a saturated solution.	
Water	10 gallons.

The copper carbonate is best dissolved in large bottles, where it will keep. Strain and dilute with water as required. Use same as Bordeaux mixture. Use *strong* ammonia and only so much as will leave a little undissolved carbonate in bottle.

No. 2.—Potassium sulphide (liver of sulphur)	1 pound.
Water	10 gallons.

Directions: Dissolve the liver of sulphur in the water. It is then ready to use, and should be used at once.

NO. 3.—CORROSIVE SUBLIMATE.

Corrosive sublimate	1½ ounces.
Water (hot)	10 gallons.

Dissolve the sublimate in the water and use.

NO. 4.—BORDEAUX MIXTURE.

Copper sulphate	1 pound.
Quicklime	1 pound.
Water	10 gallons.

Pulverize the copper sulphate and then dissolve in warm water. Slake the lime in a sufficient amount of water. Then mix the two. It is then ready for use, but will not keep more than 24 hours. It will adhere better if about one pint of molasses is added to the mixture. For rots, moulds, mildews, and fungous diseases generally.

NO. 5.—KEROSENE EMULSION.

Bar soap.....	½ pound.
Boiling water.....	1 gallon.
Kerosene.....	2 gallons.

Directions: Dissolve the soap in the water, add the kerosene, and pass through a spraying pump 2 or 3 times. In making up a small quantity, a tin egg churn may be used. Dilute before using by adding 15 parts of water to 1 part of the mixture.

NOTE.—The kerosene emulsion must be *thoroughly* made or it will burn the plants.

NO. 6.—TOBACCO DECOCTION.

Tobacco dust, or powdered leaves.....	8 pounds.
Water.....	10 gallons

Directions: Boil the tobacco in water for 1 hour, or steep in boiling water over night. Replace the evaporated water and use without further dilution. A teaspoonful of crude carbolic acid per gallon of water will greatly increase the efficacy of this decoction. It will not injure the foliage of the most tender plant.

NO. 7.—PARIS GREEN (WET).

Paris green.....	1 ounce.
Water or Bordeaux mixture.....	10 gallons.

Directions: Mix, and it is ready for use as soon as mixed.

NO. 8.—PARIS GREEN (DRY).

Paris green.....	1 pound.
Air-slaked lime or gypsum.....	50 pounds.

Directions: Mix well, and use dry.

NO. 9.—CARBOLIZED LIME.

Air-slaked lime.....	80 pounds.
Crude carbolic acid.....	1 quart.

Directions: Mix well and use as a powder.

NO. 10.—ARSENIC BAIT.

White arsenic.....	1 pound.
(Or Paris green.....	2 pounds.
Sugar.....	1 pound.
Wheat bran.....	25 pounds.

Directions: Mix well; add enough water to make a sticky mass.

NO. 11.—HELLEBORE.

Fresh white hellebore.....	8 ounces.
Water (hot).....	16 gallons.

Directions: Apply without dilution.

NO. 12.—CARBON BISULPHIDE.

Directions: Use pure, in a tight vessel or room, and handle carefully away from fire or a light, as it is explosive. For weevils.

NO. 13.—RAT POISON.

White arsenic	1 ounce.
Freshly toasted cheese	1 pound.

Directions: Sprinkle arsenic on toasted cheese; wrap whole in a thin paper bag and place where rats or mice can get at it. Renew bait with fresh material every evening until clear of rats.

NO. 14.—MOLE AND MOUSE POISON.

Sweet corn or freshly roasted peanuts, ground to a coarse meal ..	1 pound.
Paris green or white arsenic	1 ounce.

Directions: Mix the meal and arsenic, and set where field mice can get it. Drop into burrows of moles.

PLANTS AND THEIR PARASITES.

Asparagus.—*Insect Parasites.* (1) Beetle: black, with red chest, about $\frac{1}{4}$ inch long. Lays eggs on young shoots, which the grubs gnaw at a later date. The mature insect feeds upon the "tops" in summer.

Remedy: Cut beds clean and market, or destroy cuttings. Pull up all volunteer seedlings and unmarketable shoots until cutting season is over, then spray or dust plants with formulas 7 or 8.

Fungous Parasites. None of any importance known in North Carolina.

Bean.—*Insect Parasites.* (1) Cut worms: greasy, fat worms which hide in ground during the day and cut off young plants above ground during the night. (2) 12-spotted, green beetle, about $\frac{1}{8}$ inch long; riddles leaves with round holes (3) boll worm: eats into the nearly full-grown pod.

Remedies: For (1), prepare ground a few days before sowing seed and place, at intervals of a yard, a teaspoonful of formula No. 9. After seeds are planted, place teaspoonful of same every 3 feet along drill. Look out for the chickens, as this will poison them if they eat it.

For (2), spray or dust plants with formulas 7 or 8. Hand-pick the insects into shallow pans containing some water and a very little pure kerosene.

For (3), hand-pick as above.

Fungous Parasities. (1) Anthracnose or blight: attacks pods, producing discolored spots. (2) Leaf rust: causes leaves to become brown and withered.

Remedies: Spray with formula No. 2 while plants are small. Later, use No. 1. Beware of planting diseased bean seeds, which are known by their yellowish color.

Beet.—*Insect Parasites.* None of importance in North Carolina.

Fungous Parasites. (1) Leaf rust or shot-hole: causes small red spots in leaves, which soon fall away. (2) Scab: causes the upper part of beet root to become rough or scabby; it is the same disease as potato scab.

Remedies: For (1), spray with formulas 1 or 4. For (2), no remedy. Do not plant beets in soil which has produced scabby potatoes.

Cabbage.—*Insect Parasites.* (1) Flea beetle or "Fly": attacks seedlings in seed-bed and recently transplanted plants. (2) Root-maggot: bores into the root of newly set plants, causing plant to turn yellow and wither. (3) Cut worms: cut off newly set plants. (4) Caterpillars: the green and striped worms, so well-known. They eat the leaves and forming heads. (5) Aphides or plant lice. Green or brown lice, which often completely cover the leaves. They suck the sap of the plant. (6) Terrapin bug. Red and yellow-colored. Suck sap of leaves.

Remedies: For (1), dust seedlings and newly-set plants with formula No. 9. For (2), when plant is set, place around each a circle or square of tarred paper 4 inches in diameter with a hole in center just large enough to admit the stem. Cut once from edge to center to admit the stem. Or spray the plants copiously once a week with formula No. 6, or dust with formula No. 9. Formula No. 6 is specially recommended. For (3), apply a teaspoonful of formula No. 10 near each plant. Begin a week before plants are set out and place bait every 3 feet in drill. For (4), apply formulas 6, 7, 8 or 9 while plants are small. Later, use No. 11. For (5) apply formula No. 6. For (6), hand-pick into shallow pans containing water and kerosene. Look for and destroy the white, black-banded eggs on the leaves. These resemble a number of small kegs set on end.

Fungous Parasites. (1) Mildew or blight: causes leaves to mold and stem to rot. (2) Root knot or club-root: causes the root to swell into shape of a club and the plant to cease growing.

Remedies: For (1), plant only very early or very late varieties. Give plenty of moisture. Spray with formula No. 4 while plants are small, and with No. 1 later. Cabbage cannot stand our hot, dry weather of summer. The variety called "Green glazed" does better than most others, but none are reliable. For (2), treatment must be preventive.—rotate crop. Use lime freely in preparing seed-bed and also in drill or row.

Cauliflower, collard, kale, mustard and turnips have the same insect and fungous parasites as cabbage, and the treatment must be similar.

Carrot.—The carrot is practically free from parasites. Occasionally cut worms destroy a few plants. Treat these as recommended under cabbage. A large, yellow, black-banded caterpillar (*Papilio asterias*) sometimes attacks the leaves. Handpick these.

Collard.—Parasites same as those of cabbage.

Celery.—*Insect Parasites.* (1) Caterpillar, same as that which

attacks carrot. (2) Negro bug: a very small, glossy, black bug, more often found on blackberry and raspberry fruit. (3) Aphides or plant lice. (See under cabbage.) (4) Crown maggot (*Tripeta fratria*): a small, whitish, sharp-headed and blunt-tailed maggot, which bores into the crown. (5) Red spider: a very small red mite, which spins its web on underside of leaves.

Remedies: For (1), hand pick. For (2), apply *in early morning* formulas No. 6 or 9. For (3), formulas No. 6 or 9. For (4), use formula No. 6, or dig up and *destroy* the plants containing the maggots. For (5), give soil more water and spray with formula No. 2.

Fungous Parasites. Blight, (*Cercospora apii*): causes leaves and stems to turn white and wilt. Celery rarely blights when it has plenty of water and shade. It cannot be kept healthy on dry ground. Keep ground wet with water and apply formulas Nos. 1 or 2, if necessary. Celery, even more than cabbage, requires a cool and moist climate, and cannot be kept healthy without it.

Corn—Sweet.—*Insect Parasites.* (1) Bud or boll worms; the common boll worm of cotton. (2) Curlew or snout beetle: a grayish, long-snouted beetle with hard wings. Common only on low-grounds. (3) 12 spotted green beetle. (4) Wire and cut worms.

Remedies: (1) Hand-pick. (2) Dust young plants with formula No. 9. Hand-pick. Remove corn stalks when crop is mature, and do not allow reeds, sedges or rotten wood to remain on the ground. The beetle breeds and passes the winter in these. (3) Handpick. Apply formulas 6 or 7. (4) Place a teaspoonful of No. 10 near each hill.

Cucumber.—*Insect Parasites.* (1) Striped, green beetle. (2) 12-spotted, green beetle. (3) Squash bug. (4) Aphides or lice. (5) Cut worms. No. 3 is a rather large, dark-gray, long-headed bug, with a very strong bed-bug like odor. The others have been already described. (6) Pickle or melon worm; a yellowish-green caterpillar $1\frac{1}{4}$ inch long. Eats into the growing fruit, and also the leaves.

Remedies: (1) and (2), fence the insects out with mosquito netting stretched over each plant and held up by a half-hoop. Keep edges of netting covered with 2 inches of soil. Let the netting stay until the plant begins to run. Hand-pick. These beetles are very destructive and must be promptly dealt with. In home gardens hand-picking is most satisfactory. (3) and (4), hand-pick, or use formulas No. 5 or 6 in early morning. (5), No. 10 as directed for corn. Apply as soon as plants break ground and repeat once a week. For (6), hand-pick, or apply formula No. 11.

Fungous Parasites. (1) Blight, or mildew: causes leaves and stems to turn white in spots, and the leaf stems, or the whole vine, soon wilts and dies.

Remedies: (1) Apply formulas No. 1 or 2 early and often.

Egg Plant.—*Insect Parasites.* (1) Flea beetle. (2) Colorado potato beetle. (3) Blister beetles.

Remedies: For (1), apply formula 9 to seedlings. For (2) and (3),

apply formulas 7 or 8. The blister beetles are hard to kill with poisons, and may have to be hand-picked.

Fungous Parasites. (1) Leaf blight: causes on leaves yellowish, irregular spots, which soon decay. (2) Fruit mold: causes fruit to turn soft and rot in spots.

Remedies: For (1), apply No. 2 while plants are small. After fruit has set, use No. 1. Remove and *destroy* all rotten fruit. The disease is contagious.

Herbs.—The pot herbs commonly grown in North Carolina are sage, summer savory, thyme, horehound and catnip. These have no known important parasites. If insects appear, hand-pick or apply formula No. 6. For leaf spot or rust, apply formula No. 1. All these plants require a moist soil to keep them healthy.

Horseradish.—*Insect Parasites.* Probably same as those of cabbage. See page 331.

Fungous Parasites. (1) Shot-hole fungus: causes leaves to become full of small holes. (2) Probably the different fungi which attack the cabbage will also attack horseradish, which belongs to the same family. This crop is not sufficiently common in North Carolina to have developed special parasites.

Remedies: For (1), apply formula Nos. 1 or 4. For other diseases, see under Cabbage.

Kale.—Kale has same insect and fungous parasites as cabbage. See page 331.

Kohl-rabi.—Kohl-rabi has same insect and fungous parasites as cabbage. See page 331.

Leek.—The leek is a variety of onion, and is liable to the same insect and fungous parasites. See under Onion.

Lettuce.—*Insect Parasites.* (1) Root—aphide or louse. (2) Cut worm. (3) Crown maggot, (*Phorbia fusiceps*.) Lettuce is seldom injured by insects unless planted on soil previously infested by the crown borer, which more commonly attacks cabbage.

Remedies: For (1), apply formula No. 6. For (2), place a teaspoonful of No. 10 every 3 feet along drill. For (3), spray plants copiously with formula No. 6 every 3 days. Do not follow cabbage or onions with lettuce.

Fungous Parasites. (1) Shot-hole fungus: causes small circular holes in leaves.

Remedies: Apply formulas No. 1 or 11.

Melons.—Melons—musk and watermelons—have the same parasites as cucumbers. See page 332.

Mushrooms.—No important parasites known in North Carolina.

Okra.—*Insect Parasites.* (1) Aphide: the same which attacks cotton and melon plants. (2) Red-spider. (3) Cotton caterpillar. (4) Boll worm.

Remedies: For (1), apply formula No. 6. For (2), apply formula No. 2 to underside of leaves. Give the plants more water. For (3) and (4), handpick, or apply formula No. 11.

Fungous Parasites. None of importance. If leaves become spotted, "french" or rusty, apply No. 4 or No. 1. This plant likes very moist soil.

Onion.—*Insect Parasites.* (1) Root maggots: small, whitish maggots which eat away the base of the bulbs. (2) Cut worms.

Remedies: For (1), spray beds or drills copiously with formula No. 6. Use kainit and lime freely in preparing onion land. *Dig*, not *pull*, up all wilted plants and burn. Plant onions on fresh soil uninfested by the maggots. For (2), apply No. 10 as for cabbage.

Fungous Parasites. None known to attack growing crop in North Carolina. Two species of fungi attack the ripe, stored bulbs, causing them to rot. For these, dust the bulbs freely with air-slaked lime when putting away, and keep the bulbs in a dry, cool place. Sort out soft bulbs once a month.

Parsley.—Parasites same as those of parsnips. See following.

Parsnip.—*Insect Parasites.* (1) Parsnip caterpillar: light green, with bands of black and yellow spots. Chiefly troublesome to second-year plants when in seed.

Remedies: Handpick, or apply formulas No. 7 or 8.

Fungous Parasites. None of importance in North Carolina.

Pea.—*Insect Parasites.* (1) Cut worms. (2) Weevils. Infest ripe seed. (3) Boll worm. Eats pods. (4) 12-spotted, green worm. Eats into pods.

Remedies: For (1), place a teaspoonful of formula No. 10 every 3 feet along drill a few days before the peas are planted, and repeat as often as necessary. For (3) and (4), handpick. For (2), (which infests stored peas), place peas in a tight vessel or box, and put on top of the heap, within the vessel a ball of cotton-lint or rags saturated with carbon bisulphide. Use a tablespoonful for each bushel of peas, and then cover the vessel tightly to retain the fumes. Let stand for 24 to 48 hours. Then expose freely to the air until no trace of the peculiar and disagreeable odor can be detected. Great care must be used that fire or flame is not brought near the carbon bisulphide, as it is both explosive and inflammable.

Fungous Parasites. (1) Mildew, (*Erysiphe martii*): causes leaves and stems to turn white and wither. (2) Rust or spot, (*Uromyces appendiculatus*): causes pods to become spotted. (3) Mold (*Pleospora herbarum*). Similar to No. 1 in appearance and effect.

Remedies: Peas require moist soil and cool weather, without which they cannot long be kept healthy. Plant only the earlier varieties, and plant very early in spring. They are quite hardy.

Formulas Nos. 1 and 4 may be applied for all of the above diseases. Use formula No. 1, only, after pods are nearly ready for table, as it will not discolor them.

Pepper.—*Insect Parasites.* Same as those which attack the egg plant. See page 332.

Fungous Parasites. (1) Anthracnose: causing soft or rotten spots in fruit. (2) Leaf spot: similar to leaf spot of the egg plant, which see.

Remedies: Apply formula No. 4 while plants are small, and No. 1 after fruit is half-grown.

Potatoes—Irish.—*Insect Parasites.* (1) Flea beetle: causes small holes in leaves. (2) Colorado potato beetle. Eats the whole plant. (3) Blister beetles. Eat the vines. (4) Leaf-footed thistle-bug: a large, grayish bug, with large and flat thin legs: punctures the vines and sucks the sap. (5) Tobacco or Horn worm. Eats the vines. (6) White grubs, larvæ of May beetle and fig beetle. Eat the roots below surface.

Remedies: For (1), dust young plants with formula No. 9. For (2), apply Nos. 7 or 8. For (3), handpick, or apply Nos. 7 or 8. For (4), handpick, or apply No. 5. Do not allow thistles to grow in or near a potato field. For (5), handpick, or apply Nos. 7 or 8. For (6), no practicable remedy. Do not plant potatoes on recently-plowed sod ground.

Fungous Parasites. (1) Early blight: causes leaves early in season to become diseased in circular spots or rings. (2) Common or late blight: causes leaves later in season to become diseased in irregular patches, usually first appearing at tip or base. (3) Scab: causes tubers to become rough, corky or scabby.

Remedies: For (1) and (2), apply formulas No. 4 or 1 early and often. For (2), soak the seed tubers, *before cutting*, for $1\frac{1}{2}$ hours in formula No. 3. Or use seed free from scab, and plant only on land which has not borne potatoes or beets for several years. Lime and stable manure favor the growth of the scab fungus. This fungus also attacks beet-roots.

Potatoes—Sweet.—*Insect Parasites.* (1) Flea beetle. The same which attacks young cucumbers and other garden plants. They eat small holes in leaves. (2) Golden and striped tortoise beetles. Eat the leaves.

Remedies: For (1), dust young plants with formula No. 9. For (2), apply formulas No. 7 or 8, if necessary, but ordinarily these insects do little damage. Sweet potatoes require a light and rather dry soil, and on such they rarely suffer from disease, unless the crop has been grown on the same ground for a number of successive years.

Fungous Parasites. The sweet potato vine is generally free from disease. The ripe tubers are sometimes attacked by (1) black rot while in the ground, and by (2) soft rot while stored.

Remedies: For (1), use only sound seed, and rotate crop. For (2), dust the potatoes with air-slaked lime when putting away, and keep them in a warm, dry place. Sort out diseased tubers every 2 or 3 weeks.

Radish.—Parasites are the same as those of cabbage. See page 321.

Rhubarb.—*Insect Parasites.* None of importance in North Carolina.

Fungous Parasites. (1) Leaf spot, (*Phyllosticta*): causes "rusty" patches on leaves and stops their growth. (2) Shot-hole: causes small round holes in leaves.

Remedies: The rhubarb is a bog plant naturally, and thrives best in cool weather. It must have rich, moist, clayey soil to maintain

its health. For (1) and (2), apply formula No. 1. Kainit is a specially good fertilizer and stimulant for rhubarb.

Salsify.—No important parasites of salsify are known in North Carolina.

Spinach.—*Insect Parasites.* None of importance known in North Carolina.

Fungous Parasites. (1) Blight, (*cercospora*): causes leaves to turn yellow.

Remedy: Apply formulas No. 2 or 1, as recommended for celery blight.

Squash.—*Insect Parasites.* (1) Flea beetle. Eats holes in young plants. (2) Striped, green beetle. (3) 12-spotted, green beetle. These beetles eat the leaves and their larvae bore into the roots. (4) Squash bug. Punctures leaves. (5) Melon worm. Eats fruit and leaves. (6) Boll worm. Eats fruit.

Remedies: For (1), dust young plants with formula No. 1. For (2) and (3), apply Nos. 7 or 8. Handpick beetles. For (4), hand pick, or use formula No. 5. For (5) and (6), handpick, or apply formula No. 11. Nos. (1) (3) and (4) are our worst insect pests.

Fungous Parasites. (1) Anthraenose, or rust: causes leaves and stems to blight. (2) Mildew: causes leaves to become whitish and then wither.

Remedies: For (1) and (2), apply formula No. 1 early and often.

Tomato.—*Insect Parasites.* (1) Flea beetle. Eats holes in leaves. (2) Colorado potato and blister beetles. Eats vine. (3) Horn worm. Eats vine. (4) Boll worm. Eats fruit.

Remedies: For (1), dust young plants with formula No. 9. For (2), apply formulas No. 7 or 8. For (3) and (4), hand-pick, or apply formula No. 11.

Fungous Parasites. (1) Fruit rot: causes fruit to turn black and rot in irregular patches. (2) Bacterial blight: causes stems to suddenly wilt and die. (3) Leaf blight: causes leaves to turn brown in circular spots, as in case of potato. (4) Mildew: causes leaf to turn brown in irregular patches.

Remedies: For (1), apply formula No. 1 early and often. For (2), no known remedy. Pull up and burn all diseased plants, as it is contagious. Do not plant tomatoes on land recently occupied by this crop. For (3) and (4), apply formulas No. 1 or 4. Diseases (3) and (4) are common to the tomato and Irish potato. These crops should therefore not follow each other, and should, when possible, be kept far enough apart to prevent mutual infection. The disease (2) is often disseminated with the seed. Therefore beware of "cheap" seed, or that sold by irresponsible persons.

Turnip.—*Insect Parasites* are the same as those which attack cabbage. The turnip has no important fungous parasite in North Carolina, though when grown on same ground for a series of years it may develop "club-root."

Remedy: Rotate crop and use plenty of lime on soil.